world's smallest ready-to-fly! » p. 38

MODEL Airplane NEWS

20 ULTIMATE SCALE MACHINES

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FEBRUARY

CONTENTS

FEBRUARY 2005 VOLUME 133 NUMBER 2

ON THE COVER: Hobby Lobby's electric-powered P-38 ARF is a delight to fly. See Rick Bell's review on page 42 to learn why there's nothing like a twin warbird! (Photo by Deron Neblett.) ON THIS PAGE: Ernest Harwood's scratch-built Aviatik C-1 biplane looks elegant against the blue sky over the U.S. Scale Masters championships. Gerry Yarrish's coverage begins on page 38. (Photo by Gerry Yarrish.)

ULTIMATE SCALE MACHINES

EVERY MODEL AIRPLANE TELLS A STORY, and the rare masterpieces flown at the 25th annual Scale Masters championships offer both historical and individual tales. Each of these museum-quality planes embodies one full-size plane at a moment in time and reveals its history to anyone who wants to hear it. But there are more stories: thousands of hours spent fitting and sanding, rivets painstakingly applied, an engine-out on landing and, thankfully, just a bent landing gear that's easily repaired. In that sense, these scale masterpieces (such as those shown below on the Scale Masters flightline and throughout this issue) aren't so different from that old Kadet sitting on your workbench. Our full coverage of the 2004 Scale Masters starts on page 28. Prepare to be impressed!

The Scale Masters airplanes are fantastically inspirational, but is there a relatively easy way to add that kind of realism to your ARF? Sure thing—install landing and navigation lights on it! You'll be surprised by how much this simple modification adds to your plane's "wow" factor. On page 90, senior tech editor Gerry Yarrish shares every step as he outfits his Dave Patrick Models Super Cub with functional lights. Check it out, and prepare to "light it up"!

When the Hobby People crew flew their tiny, 9-inch-span WattAge Micro Flyer prototypes at last year's RCX show in Anaheim, CA, everyone wanted one. Well, we finally got our hands on a few of these little marvels, and we were amazed by their agility and performance. A ready-to-fly plane that uses a single micro actuator for rudder control, the Micro Flyer is an easy, inexpensive way to get excited about RC, and—best of all—it's nearly crash-proof! Never content to leave well enough alone, we also dressed our Micro Flyers up in pylon-racing colors. See page 38 to learn why this petite plane is creating so much enthusiasm.

Our featured construction article this month is the Ingram Foster pusher biplane designed by Pat Tritle. In this electric model, some unusual materials—toothpicks and bamboo skewers—along with traditional basswood and carbon-fiber tube are used to create a unique scale result. This beauty is sure to turn heads wherever it flies.

Is there a technique you'd like to learn or another type of article you'd like to read in *Model Airplane News*? If so, please email us at man@airage.com or write to us at 100 East Ridge, Ridgefield, CT 06877-4606 USA. We look forward to hearing from you.

Debra Cleghorn

Executive Editor

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Est. 1929

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Thanks for your continued commitment to RC fliers ...

THANKS FOR THE PLANS

I want to thank Nick Ziroli Sr., Mark Rittinger and the *Model Airplane News* staff for the two construction articles in the December 2004 issue: the T-6 Texan (with the pullout plan) and the B-26 Marauder articles are a real treat for electric modelers. For the past 30 years, I've waited for electric technology to advance to a point where flying RC planes would be fun—not experimentation. At last, that day has arrived!

It has been many years since I've seen a set of full-size pullout plans included in any model aviation magazine, and I'm grateful to people who share their "tested and flown" designs. I would like to see more of these in your magazine. Thanks for your continued commitment to RC fliers and dreamers.

GEORGE RICK [EMAIL]

George, thank you for your words of encouragement. Electric models are very popular, and we are always looking for new designers and construction articles. Nick's electric AT-6 Texan was originally published in our sister publication Backyard Flyer, *and it was so popular that we wanted to offer it to all of our readers as a pullout plan. You can also download the Texan plan from the "Click Trips" link on our website, modelairplanenews.com. And don't forget our Texan contest! (See the December issue.) Build a Texan, send us a photo, and win a T-shirt!*

GY

JR'S XP9303 ROCKS

I was pleased to see Gerry Yarrish's review of JR's new 9-channel radio in the January 2005 issue. I had heard that this new system was coming soon, and I was impressed that *Model Airplane News* covered it first. I really appreciated your 3-in-1 review that included information on its helicopter, glider and powered-aircraft applications because I fly all three! Now that you've used the system awhile, do you have any other comments about it?

RICHARD MCDOUGAL [EMAIL]

Richard, the XP9303 radio is indeed an impressive system. I was pleased to work with associate editor Rick Bell and contributor Dave Garwood to put the article together. In addition to its many scale-specific features such as switch assignment,

servo speed and aileron differential, I love using the new rolling selector to input my adjustments. The XP9303 has raised the bar for ease of use and control flexibility!

GY

MINI FOKKER FACTS

I have been a subscriber to *Model Airplane News* for many years, and I've always enjoyed your construction articles. Recently, a group of my fellow fliers decided to build 12 of the Fokker D.VIIs designed by David Johnson and featured in the February 2004 issue. The plans call for Williams Bros. wheels, but they're out of business. Could you suggest a suitable alternative?

Mr. Johnson used a Tatone muffler for his O.S. .25, but the article didn't list its item number. It looks like a neat, clean installation, but which muffler is it? Thanks!

JAMES WAHNER
MILWAUKEE, WI

Dave's Fokkers are great little biplanes. I have bought vintage wheels from two suppliers: Proctor Enterprises, (503) 678-1300, proctor-enterprises.com; and Balsa USA at balsausa.com. As for the muffler, Dave says he used an EM-2 exhaust manifold muffler (no. TAT11033) to direct the exhaust straight down and out of the engine compartment.

GY

SUPER STEARMAN SOLUTION

I read Stan Kulesa's review of Great Planes' new Super Stearman ARF in the November 2004 issue, and I ordered a kit to fly in fun-scale competition. Stan indicated that he used an O.S. 1.20 4-stroke engine, but I would like to use my SuperTigre G-90 2-stroke. Do you think this will work out? Also, do you know a good source of scale 3-view drawings and other documentation? I want to spiff up my ARF to make it look better for competition.

ANTHONY GRISWOLD [EMAIL]

Anthony, any good .90 2-stroke (such as the SuperTigre or the O.S.) will power the Super Stearman nicely. The 1.20 provides extra oomph for sport flying, but if you intend to fly your model at a scale contest, a .90 2-stroke will work fine. It will also fit in the cowl better than a 1.20 4-stroke!

A great source of scale documentation and drawings is Bob Banka's company, Bob's Aircraft Documentation at (714) 979-8058; bobsairdoc.com. This company offers thousands of photo and documentation packs. Good luck with your Super Stearman; it's an excellent choice for fun-scale competition!

GY

"PILOT PROJECTS" CORRECTION

I'm writing to correct an error in the December 2004 "Pilot Projects" column. I wish I had built the good-looking Fokker Dr.I shown at the bottom of page 22, but I only photographed it! Rich Cassata was the builder, and Grant Bright expertly manned the transmitter. Please give credit where it is due; this terrific model was the result of Rich's hard work over the course of 4½ years.

JOHN DELEVORYAS
SAN JOSE, CA

We regret the error, John. Thanks for writing!

GY

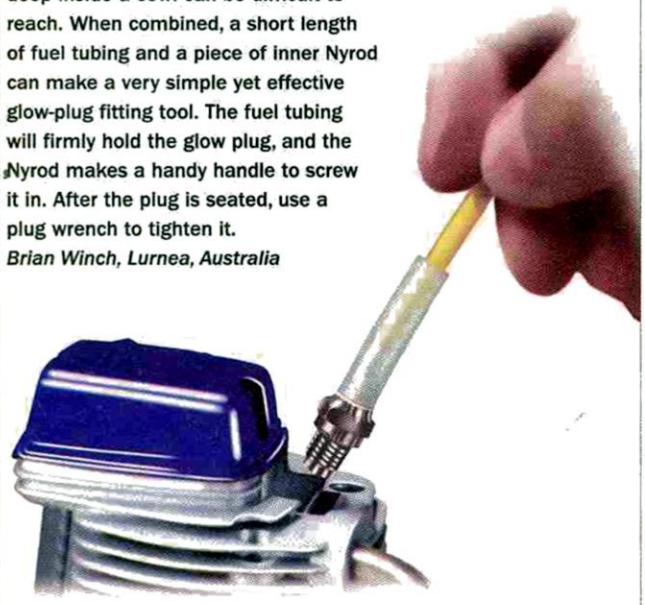
WRITE TO US! WE WELCOME YOUR COMMENTS AND SUGGESTIONS. LETTERS SHOULD BE ADDRESSED TO "AIRWAVES," *MODEL AIRPLANE NEWS*, 100 EAST RIDGE, RIDGEFIELD, CT 06877-4606 USA; EMAIL MAN@AIRAGE.COM. LETTERS MAY BE EDITED FOR CLARITY AND BREVITY. WE REGRET THAT, OWING TO THE TREMENDOUS NUMBERS OF LETTERS WE RECEIVE, WE CANNOT RESPOND TO EVERY ONE.

Illustrations by Richard Thompson

helping hand

Glow plugs that are recessed or hidden deep inside a cowl can be difficult to reach. When combined, a short length of fuel tubing and a piece of inner Nyrod can make a very simple yet effective glow-plug fitting tool. The fuel tubing will firmly hold the glow plug, and the Nyrod makes a handy handle to screw it in. After the plug is seated, use a plug wrench to tighten it.

Brian Winch, Lurnea, Australia



sweet smelling

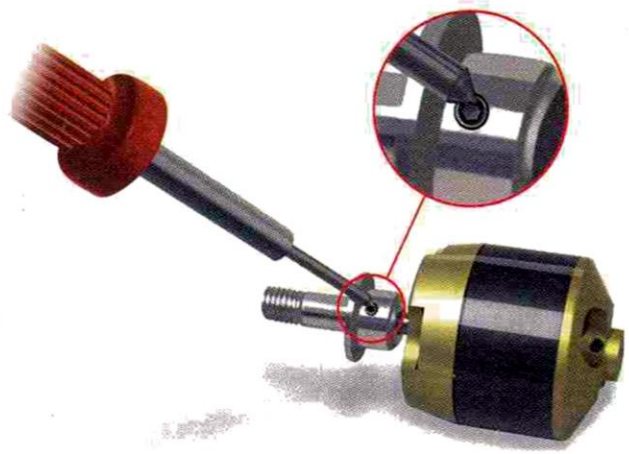
If you forgot to use a barrier cream or Latex gloves when using epoxy, don't use alcohol, acetone, or other solvents to clean your hands. Besides being harsh on your skin, those chemicals always seem to leave a sticky residue no matter how many times you wipe your hands. Instead, use hand lotion to remove the epoxy residue. Just wash your hands with the lotion, rinse it off, and then wash again with regular hand soap. It works like a charm, and your hands smell great!

Allen Rice, Boca Raton, FL

the heat is on

A lot of prop adapters on park flyers are secured on the motor's shaft with small Allen setscrews. If you use a thread-locking compound to prevent them from working loose, you know that they're almost impossible to remove after the compound has set. To remove the setscrew, place the hot tip of a soldering pencil on it for a minute or so. The heat will break the grip of the compound, and the setscrew can then be easily removed.

Tod Anderson, Las Vegas, NV



disposable mixing pads

Modelers are always looking for a scrap piece of something to mix epoxy on. Many discount stores sell 450-count notepads for less than a buck. These make great palettes for mixing epoxy. When you've finished applying the epoxy you need, just tear off the top piece of paper and a new, clean palette is ready for use.

Harold Nance, Lesage, WV ✝

SEND IN YOUR IDEAS. *Model Airplane News* will give a free, one-year subscription (or a one-year renewal, if you already subscribe) for each idea used in "Tips & Tricks." Send a rough sketch to *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. BE SURE THAT YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we can neither acknowledge each one nor return unused material.

Sig Electric Kadet Senior
Michael J. McGee
Palatine, IL

This electric conversion is sure to shock you! Michael—no stranger to RC—found it surprisingly simple to convert his glow-engine Sig Kadet into an electric-powered model. The motor was a perfect fit on the firewall and required no changes to the cowl. The battery pack also slipped effortlessly into the windshield's bay (which was the precise location for maintaining the model's CG). Michael was also quite relieved that the model maintained its 7.8-pound weight and maneuverability after the conversion was complete. Powered by a brushless Model Motors Axi 4120/18 with a 13x6.5 APC electric prop, this Kadet can fly from 8 to 10 minutes at full throttle and 20 to 25 minutes at cruising speed.

Red Baron Pizza Aeromasters
Jim Wahner & Steve Thomas
Milwaukee, WI

Jim and Steve took two Great Planes Aeromasters and modified them to look like scale Stearman biplanes! They wanted to simulate the Red Baron Pizza biplanes that tour the nation every summer. O.S. .91 4-stroke engines power these beauties, and Futaba radio systems provide guidance. The terrific finish on both is compliments of MonoKote. Jim writes, "The planes are excellent flyers—true to the Aeromaster tradition." Very creative, guys!

Curtiss P-6E Hawk
Herman Grooters
Hudsonville, MI

Modeled after the vintage P-6E of the 1930s, Herman's Curtiss Hawk is a beauty! He writes, "This is my most exciting and satisfying project in almost 60 years of modeling!" With its gorgeous MonoKote covering and trim and "awesome" air performance, who could resist such a well-made model? Herman powers his plane with a Magnum .91 RFS 4-stroke engine and a Master Airscrew 3-blade propeller. He also uses the scale exhaust stacks as exits for cooling air from the cowled engine. Herman used Nick Ziroli Sr.'s idea of a "plastic lace" rigging on the Hawk as well. Way to go!

RV-4
Donald Zepp
Ocala, FL

Beyond the RV-4's beautiful finish, one of its most intriguing features is its cockpit; Donald finished it to perfection with a specially crafted pilot and copilot. Other modifications include wingtip skids, a fiberglass cowl, wheel pants and working flaps. He reports, "This is the first model that I have flown with flaps, and when set at 30 degrees, the RV just floats to wherever I point it." Donald powers his RV-4 with a Magnum XL 46A engine, 7 GWS servos and a Futaba FP-T8UAP radio. He has flown this model for nearly two years now, and we're certain that he'll have many more successful flights with it.

Go-Fly-245
Walter J. Gremlitz
Sun City, FL

Walter's Go-Fly-245 sailplane has a 96.5-inch wingspan and 656 square inches of wing area. It's made of foam, hardwood veneer and a plastic coating. The slender fuselage is 52 inches long and is made of molded Duraflex with a steel dihedral brace for mounting the wings. Walter constructed the tail surfaces out of Duraflex as well; they're strong and lightweight yet very resilient. He powers the Go-Fly with an O.S. .10 engine, a Hitec micro-receiver, 3 servos and a 7x4 Master Airscrew prop. He also installed an optional engine pod made of plastic and aluminum with a built-in fuel tank, a nosewheel, a steerable tailwheel and wingtip hoops. Walter's terrific model weighs only 6.75 pounds. With its slender shape and curvaceous paint scheme, this beauty must look great in flight!

Bulldozer
Jaromir Pipek
Milevsko, Czech Republic

This vintage model is assembled from plans that Jaromir dug up from a 1945 issue of *Model Airplane News*! Covered in yellow and red Modelspan, this bright bird is sure to catch your eye. The Bulldozer has a wingspan of 46 inches, is 30.75 inches long and is the first Bulldozer we've ever heard of that weighs only 28.9 ounces! Jaromir powers his model with a 1.8 CC Super Atom Czech diesel engine, and he writes that the Bulldozer is a very good flyer that took him only two months to build. Thanks for reviving an oldie but goodie!

Sig Four Star .60
Ray Shroba III
Minooka, IL

This is Ray's second time building a Four Star .60. After learning from trial and error on his first go-around, Ray decided to modify his Four Star a bit to make it fly "... stable and very smooth with excellent control and authority at all speeds." Modifications include removing all dihedral, adding flaps, extending the wingspan to 78 inches and enlarging the tail surfaces. He also replaced the landing gear with Du-Bro Super Gear and mounted the engine on its side in the fuselage's nose. This 10-pound model is powered by a Magnum .91 4-stroke engine and a Futaba T9CAP radio, and it's covered with UltraCote. Ray says his Four Star "... is a keeper," and we agree!

Giant Delta Vortex
Vincent C. Caruso
Center Valley, PA

This monster, which Vincent calls "The Beast," took 250 hours to construct over the course of a year! Sporting a 108-inch wingspan, the 42-pound, scratch-built Beast is powered by a ZDZ 80cc engine and features Robart retracts, a 22x10 Zinger propeller, 9 Hitec servos and a Futaba radio. For easy transportation, Vincent built his Delta Vortex in three parts; each wingtip is connected with two, 1½-inch tubes and four studs. And the covering? Vincent went through 12 rolls of UltraCote to achieve the attractive finish.

SEND IN YOUR SNAPSHOTS. *Model Airplane News* is your magazine and, as always, we encourage reader participation. In "Pilot Projects," we feature pictures from you—our readers. Both color slides and color prints are acceptable, but please do not send digital printouts or Polaroid prints. Emailed submissions must be at least 300dpi. We receive so many photographs that we are unable to return them. All photos used in this section will be eligible for a grand prize of $500, to be awarded at the end of the year. The winner will be chosen from all entries published, so get a photo or two, plus a brief description, and send them in! Send those pictures to "Pilot Projects," *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA.

CARL GOLDBERG PRODUCTS
PITTS MONSTER ARF

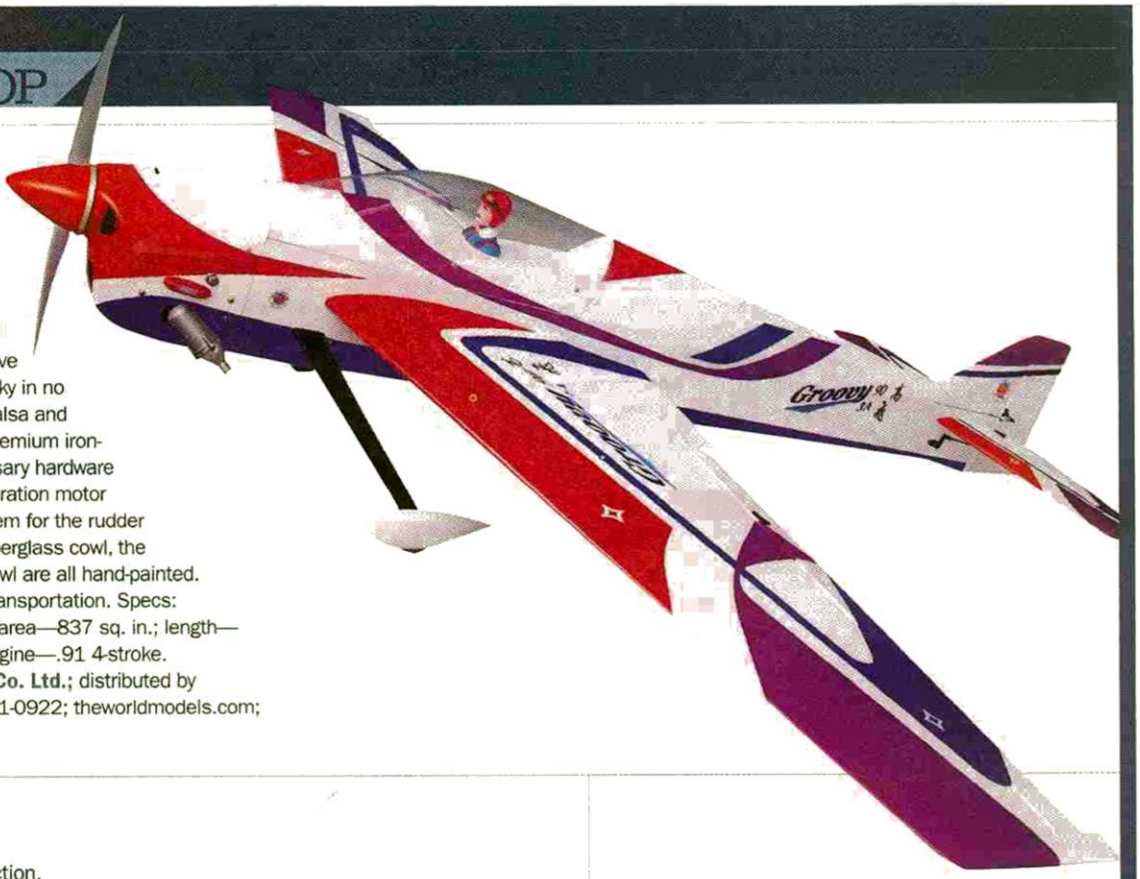
This big bipe has all the high-quality features you've come to expect from CG Models, including an all-wood airframe and built-up wing, iron-on covering, a two-color, painted-fiberglass cowl and wheel pants, a two-place cockpit, a tinted canopy and painted-aluminum landing gear. The Monster Pitts comes with a complete hardware package, including aluminum landing gear, wheels and a fuel tank. Specs: wingspans (top/bottom)—60/58 in.; length—56 in.; weight—11.25 to 12.25 lb.; radio req'd—4-channel with 7 servos; engine req'd—.90 to 1.08 2-stroke or 1.20 4-stroke; $430.
Carl Goldberg Products; distributed by Great Planes Model Distributors (217) 398-6300; (800) 682-8948; greatplanes.com.

TOP FLITE
PIPER ARROW

Looking for a winter project? Check out this 81-inch-span beauty. With the high-quality parts and hardware that Top Flite is known for, optional Robart retracts and an optional cockpit kit, you'll have as much fun building this kit as you will flying it! The Piper Arrow is designed for a .60 2-stroke, has 1,089 square inches of wing area and is almost 62 inches long; it costs $250.
Top Flite; distributed by Great Planes Model Distributors (217) 398-6300; (800) 682-8948; top-flite.com.

CLANCY AVIATION
ASCENDER RTF

This EPP-foam flying wing is durable enough to withstand everyday bumps. Twin molded fins enhance its stability, and its tricycle landing gear and steerable nose gear mean that you can fly it off a hard surface without worrying about damaging its underside on landing. Best of all, it includes a 4-channel Cirrus radio system. Specs: wingspan—27 in.; wing area—194 sq. in.; length—14.5 in.; weight—11.4 oz.; price—$180.
Clancy Aviation; distributed by Global Hobby Distributors (714) 963-0329; globalhobby.com.

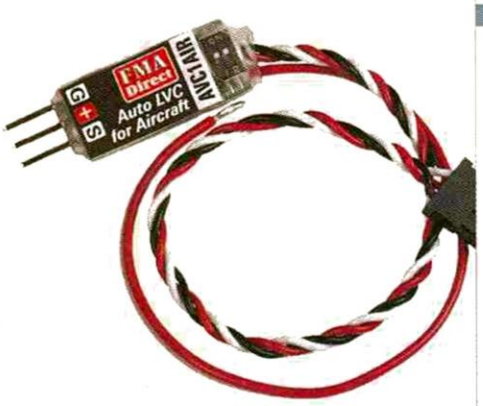


THE WORLD MODELS MFG. GROOVY 3A 90

This new ARF plane will have you grooving through the sky in no time. The kit is made of balsa and plywood, and it features premium iron-on covering. All the necessary hardware is included, and an anti-vibration motor mount and a pull-pull system for the rudder are featured items. The fiberglass cowl, the belly pan and the under-cowl are all hand-painted. Plug-in wings allow easy transportation. Specs: wingspan—65.5 in.; wing area—837 sq. in.; length—67 in.; weight—8.4 lb.; engine—.91 4-stroke.
The World Models Mfg. Co. Ltd.; distributed by AirBorne Models (925) 371-0922; theworldmodels.com; airborne-models.com.

FMA DIRECT AVC1AIR

This automatic, cell-detection, low-voltage-cutoff device is designed to be used with brushed and brushless electronic speed controls (ESCs). It shuts down the motor if the signal is lost. It senses a Li-poly, Ni-Cd, or NiMH pack's voltage and automatically determines the appropriate cutoff voltage. You can easily program in your own low-voltage cutoff by using a voltmeter and flipping a tiny switch on the printed-circuit board. When the pack reaches a safe cutoff voltage, the AVC1AIR cuts off the motor while it retains enough battery power to operate the receiver for safe landing. It costs $20.
FMA Direct (800) 343-2934; (301) 668-4280; fmadirect.com.

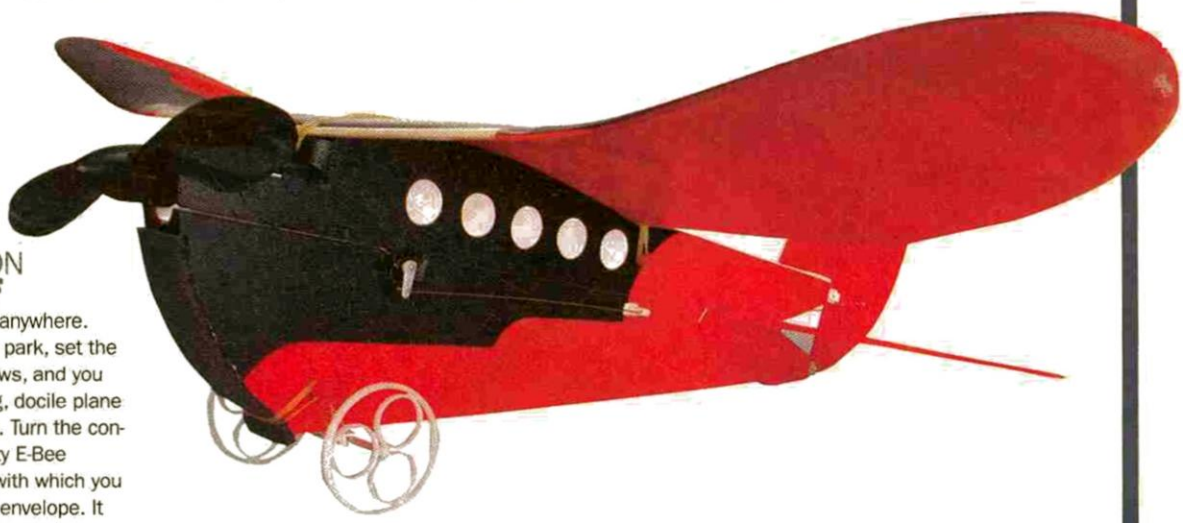


WINGSPRO SYNERGY 3D

Designed by TOC winner and F3A World Champion Christophe Paysant-LeRoux, this 76.38-inch-span model was developed to compete in the new international F3A Artistic Aerobatics, so it not only is a precise flyer but also has incredible 3D capabilities. This all-composite plane uses carbon fiber extensively, so it's light and strong and perfectly symmetrical. You need only install the control horns, the hinges, a radio and a 1.20 to 1.60 engine. The Synergy 3D comes in yellow, orange, yellow/white and blue/white schemes. Price: $1,490.
Wingspro (858) 549-9902; wingspro.com.

MAXX PRODUCTS OUTRUNNER BRUSHLESS MOTORS

Here's a choice of two new motors that can replace your standard Speed 280, 370, or 400 motor. The direct-drive Himax HC 2808 and HC 2012 are tiny but big on power and torque. They were designed for durability and efficiency of operation, and each is offered in three kilovolt ratings. The motors include a prop adapter and two mounting brackets—one for stick mounting and one for radial mounting. The HC 2808 is perfect for sport flyers; use the HC 2812 for high-performance and 3D flying. The HC 2808 costs $56 and the HC, $64.
Maxx Products Intl. (800) 416-6299; (847) 438-2233; maxxprod.com.



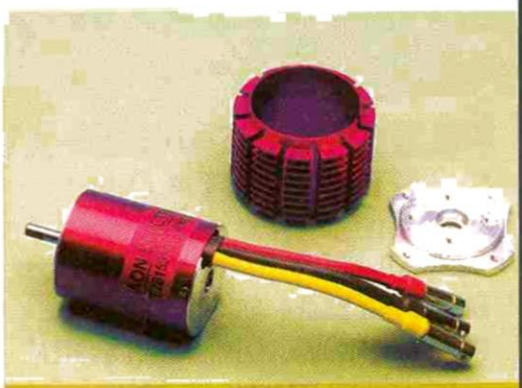
CLANCY AVIATION
LAZY E-BEE RTF

You can fly this just about anywhere. Take the Lazy E-Bee to the park, set the controls to the lowest throws, and you have an enjoyable, relaxing, docile plane with very stable slow flight. Turn the control throws up, and the Lazy E-Bee becomes a lively fun-flyer with which you can risk pushing the flight envelope. It comes with a 4-channel Cirrus radio system and costs $180. Specs: wingspan—28.5 in.; wing area—240 sq. in.; length—23 in.; weight—9.5 oz. **Clancy Aviation;** distributed by Global Hobby Distributors (714) 963-0329; globalhobby.com.

E-FLITE
Brushless Motors & Speed Controls

Looking for electric performance that won't break the bank? Whether you need a motor upgrade or you want to outfit your plane with the best right from the start, check out these new lines of light, high-power motors and reliable brushless speed controls. E-flite has also teamed up with Hacker to offer new E-Series motors for $70 each. The Park 370 Outrunner motors cost $50; the 20A speed control costs $42; and the 40A controller costs $55.

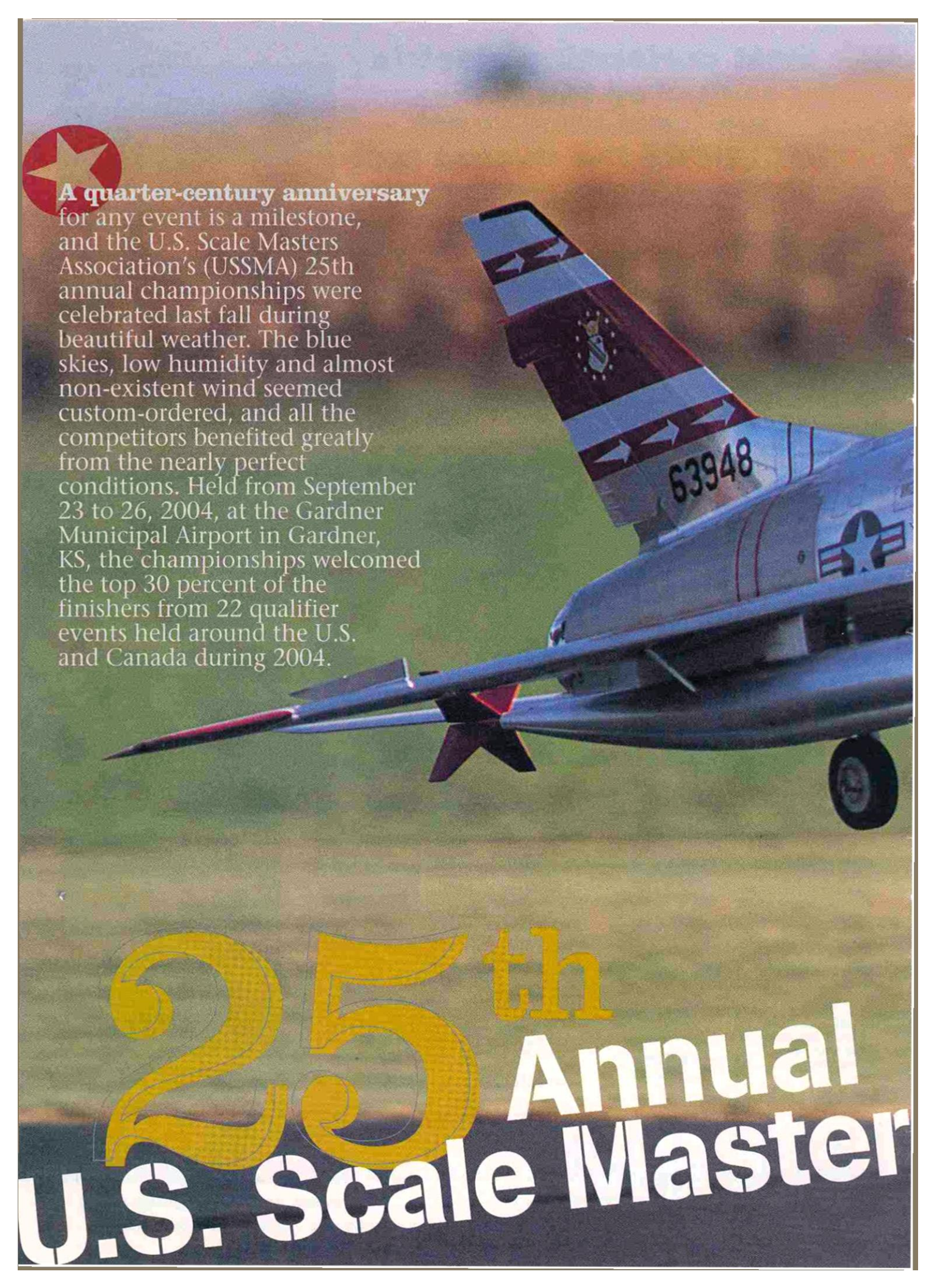
E-Flite; distributed by Horizon Hobby Inc. (217) 352-1913; horizonhobby.com.



AON ELECTRIC
Thrust Series Brushless Motors

These new motors offer dual ball bearings, a hardened-steel shaft, a one-piece magnet, replacement parts and an anodized case without electrical noise. The KV 3000 swings a 5x4 to 7x5 prop with direct drive. If you add a 3.2: 1 gearbox and an 11.1V battery pushing 19 amps and then switch to an 11x7 prop, you'll have approximately 1.6 pounds of thrust! Aon Electric also offers front endbells and hop-up items, including ceramic ball bearings and anodized CNC heat sinks.

Aon Electric (310) 470-5188; aonelectric.com. +



25th Annual U.S. Scale Master

A quarter-century anniversary for any event is a milestone, and the U.S. Scale Masters Association's (USSMA) 25th annual championships were celebrated last fall during beautiful weather. The blue skies, low humidity and almost non-existent wind seemed custom-ordered, and all the competitors benefited greatly from the nearly perfect conditions. Held from September 23 to 26, 2004, at the Gardner Municipal Airport in Gardner, KS, the championships welcomed the top 30 percent of the finishers from 22 qualifier events held around the U.S. and Canada during 2004.

First place Expert winner and Grand Champion Terry Nitsch brings his beautiful F-100F Super Sabre in for a landing after its final flight round.

Championships

A SILVER ANNIVERSARY OF SCALE EXCELLENCE

BY GERRY YARRISH > PHOTOS BY GERRY YARRISH

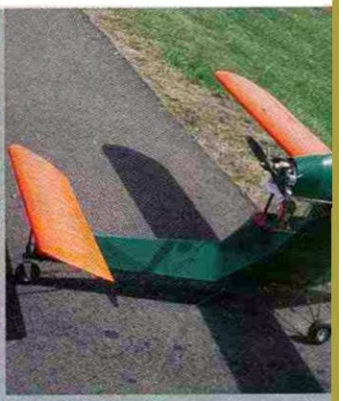
Max Ficken's P-47 Thunderbolt comes in low for the camera. The 80-inch "Jug" was built from a Yellow Aircraft kit and is powered by a Quadra 40cc gas engine. Max placed 18th in Expert.

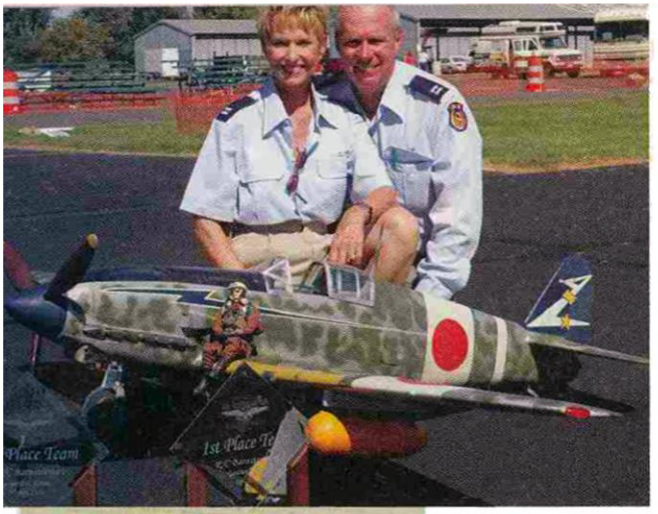
This Fuji BT-32-powered C-47A was built by Greg Hahn from Ziroli plans. The Skytrain released six paratroopers during a low pass. Greg placed 14th in Expert and won the Best Multi-Engine plane award.

Dave Pinegar and George Maiorana placed third in Team Scale with this electric-powered AEW. Four MaxCiM NEO 13Y brushless motors powered with Kokam Li-poly batteries prov than enough power to carry the 115-inch, 26-pound aircraft through all of its maneuvers.

The facility was ideal: a long, paved main runway with a nicely groomed grass strip alongside it and a central staging area made the logistics of the event a dream come true. There were four lanes in the staging area, and each lane had three or four "on-deck" models waiting for clearance to the active runway. Four flight stations gave the pilots and the judges plenty of elbow room. The air boss, Steve Milam, and his assistant linemen were in constant radio contact with one another, and they maintained an efficient yet unrushed control of the many takeoffs and landings.

Zack Skychalla's FR Mk. XVIVe Spitfire settles in for a landing. Powered by a ZDZ 40cc gas engine, th Yellow Aircraft Spitfire has a 92-inch span and weighs 28 pounds. Zack placed third in Expert.





The Winning Team

COMING TO KANSAS ALL THE WAY FROM DENVER, CO, BRIAN O'MEARA captured the first-place Team slot with his tried-and-true WW II Japanese KI-61 Tony fighter. Brian's 86-inch-span Tony features a fiberglass fuselage and foam wings that he built using Frank Tiano/Don Smith plans. An O.S. 1.60 2-stroke engine provides the power, and the plane sits on Sierra Precision retracts. Brian uses an Airtronics 10-channel Infinity radio.

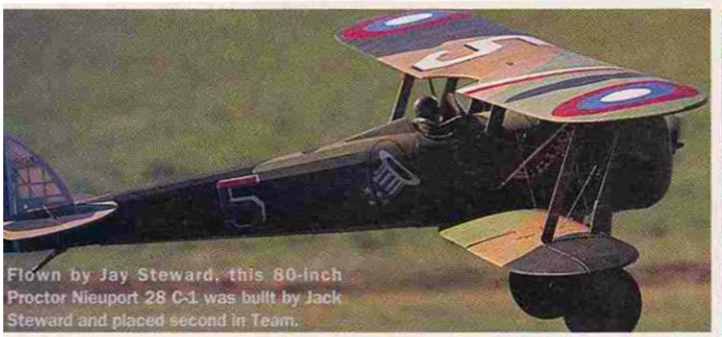
Although his builder, James Hammond Jr., could not attend the championships, Brian and his wife, Bonnie, won first in the Team competition, and he tied with Lee Rice for the highest flight score of 95.25.

When Dave Pinegar isn't flying George Maiorana's Chinese AEW in Team, you can find him flying this T-34A in Expert. Built from a Top Flite kit and powered by an O.S. .91, the Mentor earned Dave 10th place.

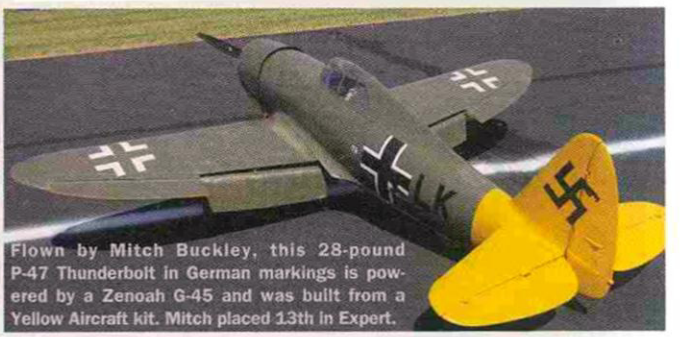
First Place Expert and Grand Champion

HAILING FROM GROVE CITY, OH, TERRY NITSCH earned the two top spots at the Scale Masters by winning the first place in Expert and the Grand Champion awards with his ever-popular F-100F Super Sabre. With his wife and caller, Sheila, by his side, Terry also earned the Best Jet, Best Markings and High Static awards with his two-place "Stretched Hun."

The 80-inch-span Super Sabre weighs 40 pounds and was built from a BVM kit. Powered by an AMT AT450 turbine engine, the 1/6-scale jet burns Jet-A fuel and is controlled by a JR radio.



Flown by Jay Steward, this 80-inch Proctor Nieuport 28 C-1 was built by Jack Steward and placed second in Team.



Flown by Mitch Buckley, this 28-pound P-47 Thunderbolt in German markings is powered by a Zenoah G-45 and was built from a Yellow Aircraft kit. Mitch placed 13th in Expert.

Out of the ordinary

TO GAIN AN EDGE, a scale modeler will often choose a subject that no one else has thought about. When it comes to the Scale Masters, you can be sure there will be some very unusual models in the mix.

In Team competition, Claude McCullough's 1/4-scale Trella T-106 (photo far left) was scratch-built from plans that Claude developed from R.F. Pauley 3-views. Flown by Mike Gretz, the 112-inch-span, twin-tail boom pusher design was powered by a 4-cylinder O.S. 320 Pegasus turning a 22x8 prop. The T-106 was completely detailed, and it placed 18th.

With its orange paint job, Bob Heikell's Bellanca Series-J Long Distance Special (photo left center) was certainly one of the brightest models at the meet! Built from modified Jerry Bates plans, the 150-inch-span airplane was modeled after a replica of the first aircraft to complete a transpacific, nonstop flight from Japan to Wenatchee, WA, in 1931. It's powered by a G-62 and covered with Sig Koverall. Bob won the Best Golden Age and Best Civilian awards, and he also placed 19th in Expert with it.

Gee Bees are usually chubby little Golden Age racers. But how about a Gee Bee canard called "the Ascender"? Robert Patterson built a 1/4-scale Ascender (photo near left) from 3-view drawings and powered it with an O.S. FT-160 twin-cylinder engine. Spanning 113 inches, the Ascender weighs 17 pounds and is covered with both Sig Koverall and Super Coverite. This Gee Bee wouldn't win many races because pilot Gene LaFond says he has to use all four control surfaces all the time to keep it pointing in the right direction! Certainly the most unusual model at the meet, the green and orange canard placed 13th in the Team competition.

John Mota flew this P-38L Lightning for Frank Banks in Team and placed eighth. The 114-inch-span, twin-tail fighter weighs 50 pounds. John and Frank also won the Best Military award.

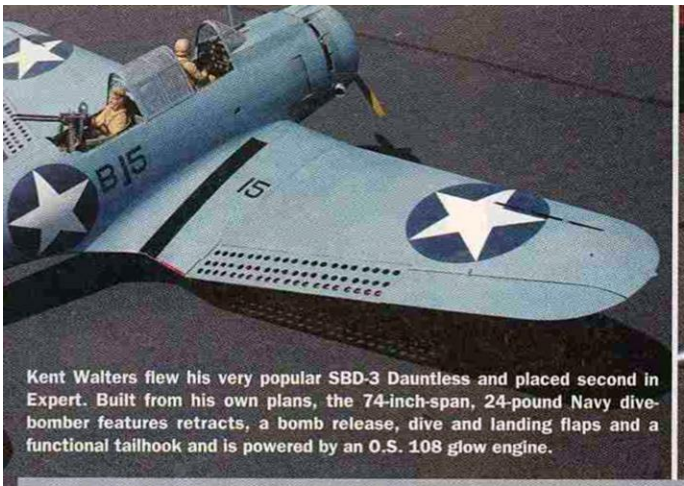
Top Ten Winners

Expert

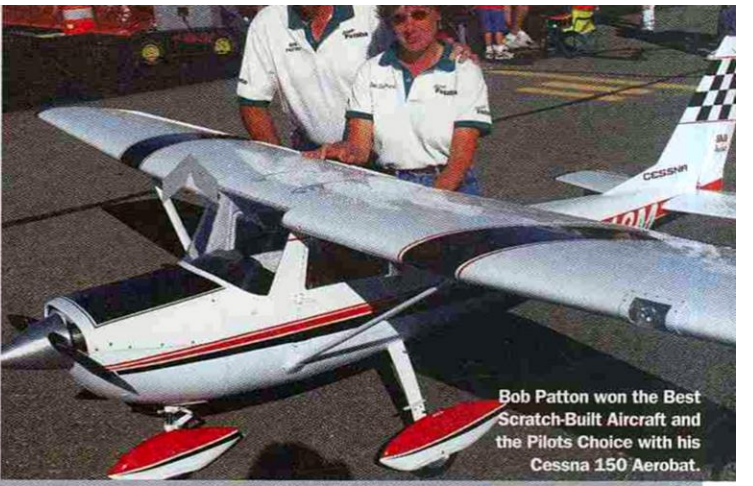
Place	Pilot/Builder	From	Aircraft	Static	Flight	Total
1	Terry Nitsch	Grove City, OH	F-100-F	99.75	94.000	193.750
2	Kent Walters	Scottsdale, AZ	SBD-3 Dauntless	99.75	92.750	192.500
3	Zach Spychalla	Watertown, WI	Spitfire MK XVIVe	99.75	91.666	191.416
4	Lee Rice	Keller, TX	F4U Corsair	99.75	91.333	191.083
5	Tom Wolf	Goleta, CA	DH Mosquito FBVI	99.75	91.167	190.917
6	Leo T. Spychall	Watertown, WI	Spitfire MK XIVE	98.75	91.917	190.667
7	Bob Patton	Saint Joseph, IL	Cessna 150 Aerobat	99.75	89.583	189.333
8	Larry Folk	Pickerington, OH	Top Cub PA1-8 180	99.50	89.417	188.917
9	Dick Konkle	Smyrna, GA	Aeronca 7AC Champ	99.75	89.166	188.916
10	David Pinegar	Warren, MI	T-34A Mentor	98.25	90.583	188.833

Team Scale

1	Brian O'Meara James Hammond Jr.	Denver, CO	KI-61 Tony	99.50	93.667	193.167
2	Jay Steward Jack Steward	Phoenix, AZ	Nieuport 28 C-1	99.75	90.917	190.667
3	David Pinegar George Maiorana	Warren, MI	Chinese AEW	99.50	91.083	190.583
4	Gary Parker Dick Heininge	Wilsonville, OR	Fleet Model-1	99.75	89.000	188.750
5	Jeremy Arvin Dale Arvin	Jeffersonville, IN	SNJ-5 Texan	99.50	88.667	188.167
6	John Urton Kelly Tippetts	Kansas City, MO	Curtiss Robin	99.25	88.917	188.167
7	Scott Russell Wayne Siewert	Woodbury, MN	P-47 Thunderbolt	99.50	88.583	188.083
8	John Mota Frank R. Banks	Gilroy, CA	P-38 Lightning	99.25	88.333	187.583
9	Curtis Kitteringham Ron Peterka	Escondido, CA	Stinson SR-9 gull-wing	99.50	87.083	186.583
10	Paul Haynes Steve Wilson Lynn Hersh	Redmond, OR	Nieuport 28 C-1	99.50	86.167	185.667



Kent Walters flew his very popular SBD-3 Dauntless and placed second in Expert. Built from his own plans, the 74-inch-span, 24-pound Navy dive-bomber features retracts, a bomb release, dive and landing flaps and a functional tailhook and is powered by an O.S. 108 glow engine.



Bob Patton won the Best Scratch-Built Aircraft and the Pilots Choice with his Cessna 150 Aerobat.

Special Achievement Awards

Award	Recipient	Aircraft	Note
Best Biplane	Ernest Harwood	Aviatik C-1	
Best Multi-Engine	Greg Hahn	C-47A Douglas	
Best Golden Age	Bob Heikell	Bellanca Series J-Long Distance	
Best Civilian	Bob Heikell	Bellanca Series J-Long Distance	
Best Military	Frank R. Banks	P38 Lightning	Pilot: John Mota
Best Jet	Terry Nitsch	F-100-F	
Best Markings	Terry Nitsch	F-100-F	
Best Documentation	Bob Heikell	Bellanca Series J-Long Distance	
Best WW I	Jack Steward	Nieuport 28 C-1	Pilot: Jay Steward
Best WW II	Tom Wolf	DH Mosquito FBVI	
Best Built-Up Kit	Larry Folk	"Top Cub" PA1-8 180 Super Cub	
Best Scratch-Built Aircraft	Bob Patton	Cessna 150 Aerobat	
Engineering Achievement	Robert Patterson	Ascender	Pilot: Gene LaFond
High Static	Terry Nitsch	F-100-F	
Pilots Choice	Bob Patton	Cessna 150 Aerobat	
Harris Lee Lifetime Achievement	Austin Goodwin	F6F-3 Hellcat	
High Flight	Lee Rice/Brian O'Meara	F4U Corsair/Tony	Tied score of 95.25
Most Realistic Flight Team	Curtis Kitteringham	Stinson SR-9 GullWing	
Most Realistic Flight Expert	Jack Buckley	1937 DH-82 Tigermoth	
Best Mission Award Team	George Marioana	Chinese AEW	Pilot: David Pinegar
Best Mission Award Expert	David Pinegar	T-34A Mentor	

Bent-wing raffle

AS AN ONGOING FUNDRAISER FOR THE U.S. SCALE MASTERS, a beautiful, completely built scale model is offered every year as a raffle prize. For the organization's silver anniversary, the prize was an immaculate F4U Corsair built by the USSMA's national chairman, Earl Aune. Earl placed 15th in Expert with a Laser 200-powered Night Fighter Corsair at the 2002 Phoenix, AZ, Championships, and he also won the Engineering Achievement award. The model Earl built has folding wings and a radar screen on the instrument panel that actually sweeps around.

The bent-wing raffle prize was won by Reese Inman of Wichita Falls, TX. That's an impressive prize for a mere $5!

Several full-size aircraft from the Heart of America Wing flew during the noontime show. Here, a T-6 Texan makes a low pass.

The paved pit area provided a clean, dust-free environment, and it was always filled with models for the spectators. Grandstands lined the rear of the pit area, and behind the parking area, several local organizations provided refreshments for sale from the open hangars. Everyone agreed that the entire area of operation was as perfect as anyone could ever hope!

STATIC JUDGING

Static judging was held on Thursday at the New Century Air Center in a Commemorative Air Force (CAF) Heart of America Wing hangar. Each contestant took his turn at the judging table and had a photograph taken with his model for display on the scoreboards. This arrangement kept the spectators well informed during the flying portion of the event and made it easy for everyone to know who was flying which aircraft.

One of the interesting aspects of the 2004 event was that the static scores were unusually close. The highest score was 99.75 and the lowest was 96. This grouped many of the contestants so closely together that extra emphasis had to be placed on every flight. With the beautiful flying conditions that prevailed, lightly loaded biplanes and Piper Cubs had the same chances of winning as the usually favored heavy-metal fighters. For everyone, the closely scored static judging was *the* topic of discussion.

ON THE FLIGHTLINE

The Championships always bring together some very impressive models. This time, there were competitions for Expert and Team Scale classes and for Grand Champion. When the dust settled on Sunday afternoon, Terry Nitsch was the Expert winner and the Grand Champion with his turbine-powered F-100F Super Sabre. The Team Scale winner was Brian O'Meara with his Japanese KI-61 Tony fighter. The difference between Terry's and Brian's final scores was a mere 0.583 point, so you can see just how close this level of competition really is.

Besides the rankings on the winners' list, many special achievement awards are also earned at the Championships. They range from Best of Class, Best Markings and Engineering Achievement to Best Multi-Engine Performance, High Static and Flight scores, all the way to the highly coveted Harris Lee Lifetime Achievement award. These and several others were handed out during the Saturday night awards banquet. Contest director John Ostmeyer and the USSMA national chairman, Earl Aune, presented plaques to the winners and gave a presentation on the latest news and developments that contribute to the growth of the USSMA.

Because the event was so carefully planned, developed and executed, and because of the enthusiasm of the hardworking members of the RC Barnstormers Model Airplane Club who hosted it, the 2004 event was a huge success. John Ostmeyer and Vanguard leader Pat Hewitt had everything under control. With such a strong base of qualifier events and host clubs that support the Scale Masters, it's a sure thing that this world-class event is going to be around for at least another 25 years! If you haven't ever attended the Championships, do yourself a favor and attend one when it comes to a state near you. In 2005, it will be held at Castle AFB in Atwater, CA. See ya there! ✈

Dick Hansen's Sopwith 1½ Strutter earned him 15th place in Expert.

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WORLD'S
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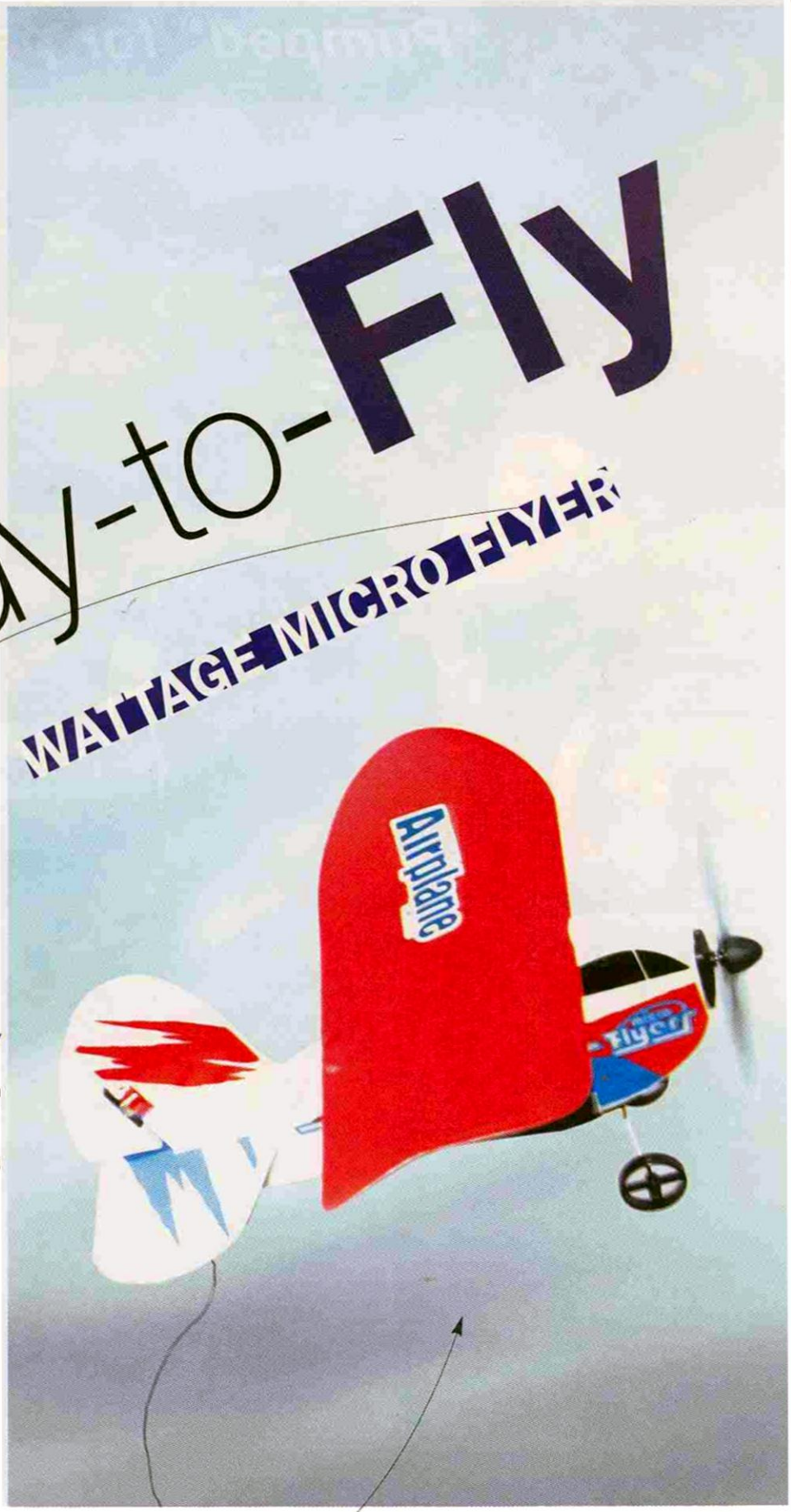
Ready-to-Fly

WATTAGE MICRO FLYER



HAVE YOU EVER WANTED A REALLY small RC model—something small and light enough to fly indoors but with enough control and power to fly in your backyard? Well, the folks at WattAge have come up with a little foamy called "Micro Flyer," and it fills this job description nicely! With a slight resemblance to the popular Lazy Bee fun-fly model, the Micro Flyer comes as a complete package and doesn't require any assembly.

The Micro Flyer comes with a 27 or 49MHz transmitter, so you and a friend can fly two Micro Flyers at the same time. The battery charger is built right into the back of the transmitter case. Just insert the model's Li-poly battery and start the charge cycle. When the red light stops flashing, you're ready for action. There's no on/off switch to add weight to this 1-ounce flying machine; just plug in the battery, and the model is ready. What could be simpler?

ERRY YARRISH
HOTOS BY DERON NEBLET

1. The WattAge Micro Flyer is the first ready-to-fly model to use magnetic-actuator control. Just charge the battery and fly!

2. The 27 or 49MHz transmitter has a built-in charger for the airborne battery pack.

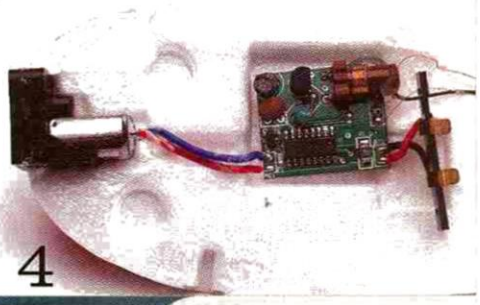
3. This is the magnetic actuator that moves the rudder.

4. A single circuit board controls both the motor and the rudder. The fine, copper-colored wire to the right carries current to the steering's magnetic actuator. The single black wire is the receiver's antenna.

1

2

3



4

Simple control

Powered by 6 AA batteries, the transmitter has three control buttons—one for motor on/off control and two for momentary steering (left and right). Press the motor button, and the prop spins until you release it. Press either of the steering buttons, and the rudder is deflected in whichever direction you chose.

What's really cool about the Micro Flyer is that it's the very first completely ready-to-fly (RTF) model to feature a magnetic-coil actuator for control. A small magnet is attached to the rudder's leading edge, and just in front of it, there's a fine wire coil. The rudder is hinged with short rubber bands, and it stays in the neutral position until you input a command. When you press either of the steering buttons, the coil is energized and the magnet swings in the appropriate direction. Control is not proportional, but it is more than adequate to guide the little foamy.

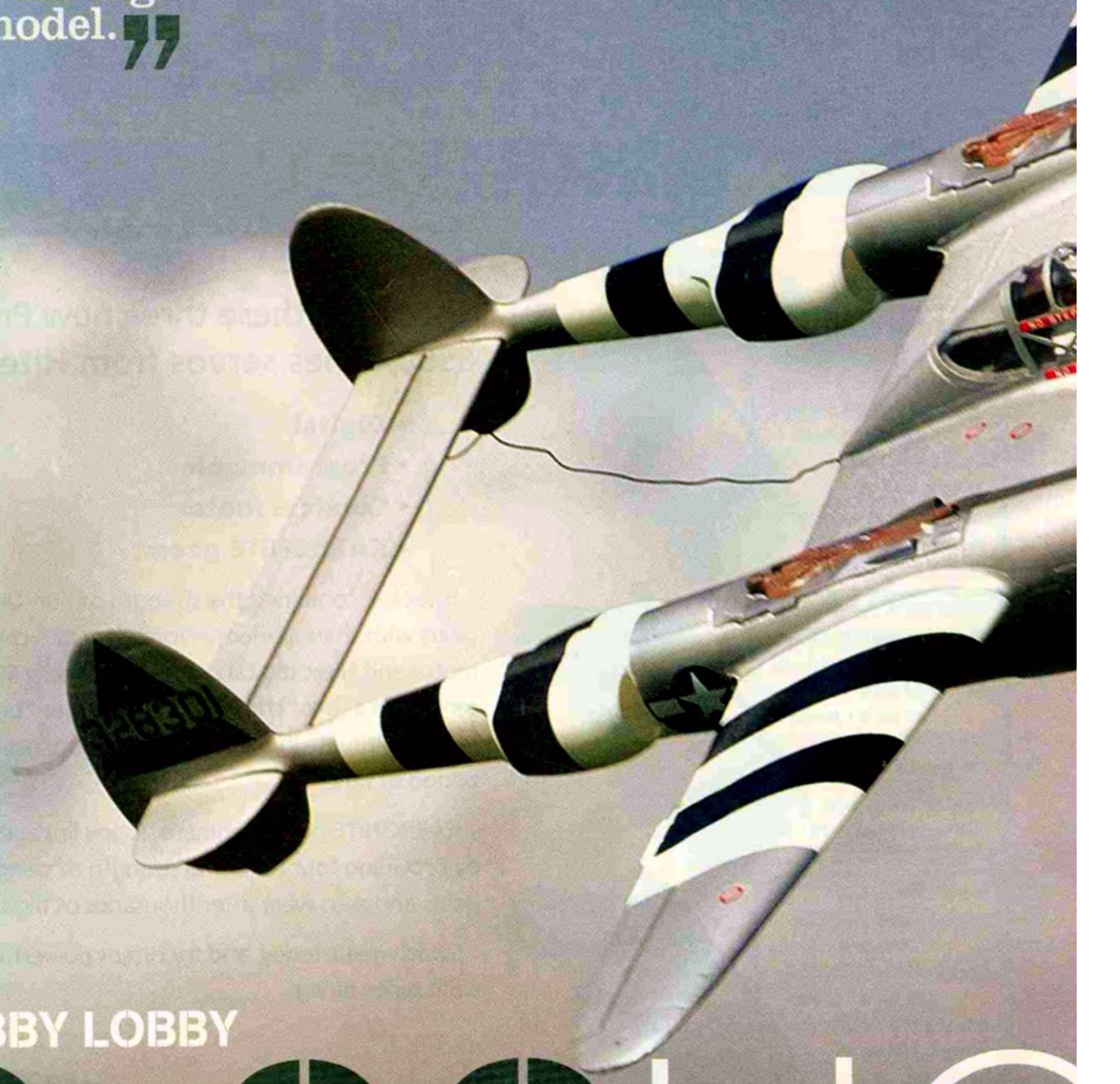
Controlling the Micro Flyer involves nothing more than giving it motor control to go up and pressing the steering buttons to determine its flight path! To launch the model, give it a moderately firm toss, and press the power button after it leaves your hand. It will torque-turn to the left. Let it climb for a few moments, and then steer it. If you give it rudder with the motor off, it will go into an impressive spin and lose altitude. Release the rudder and give it power to climb back up for more aerial antics!

See the Source Guide on page 137 for manufacturers' contact information.

Specifications
Model: Micro Flyer
Manufacturer: WattAge
Distributor: Global
Wingspan: 9 in.
Length: 8¼ in.
Weight: 1 oz.
Radio: 2-function (motor, rudder)
Price: $39.99

Comments: this all-foam, ready-to-fly airplane can be flown indoors or out (on calm days). The rudder uses a magnetic-coil actuator for momentary right/left steering; motor control is on/off. The transmitter operates on 27 or 49MHz and has a built-in battery charger.

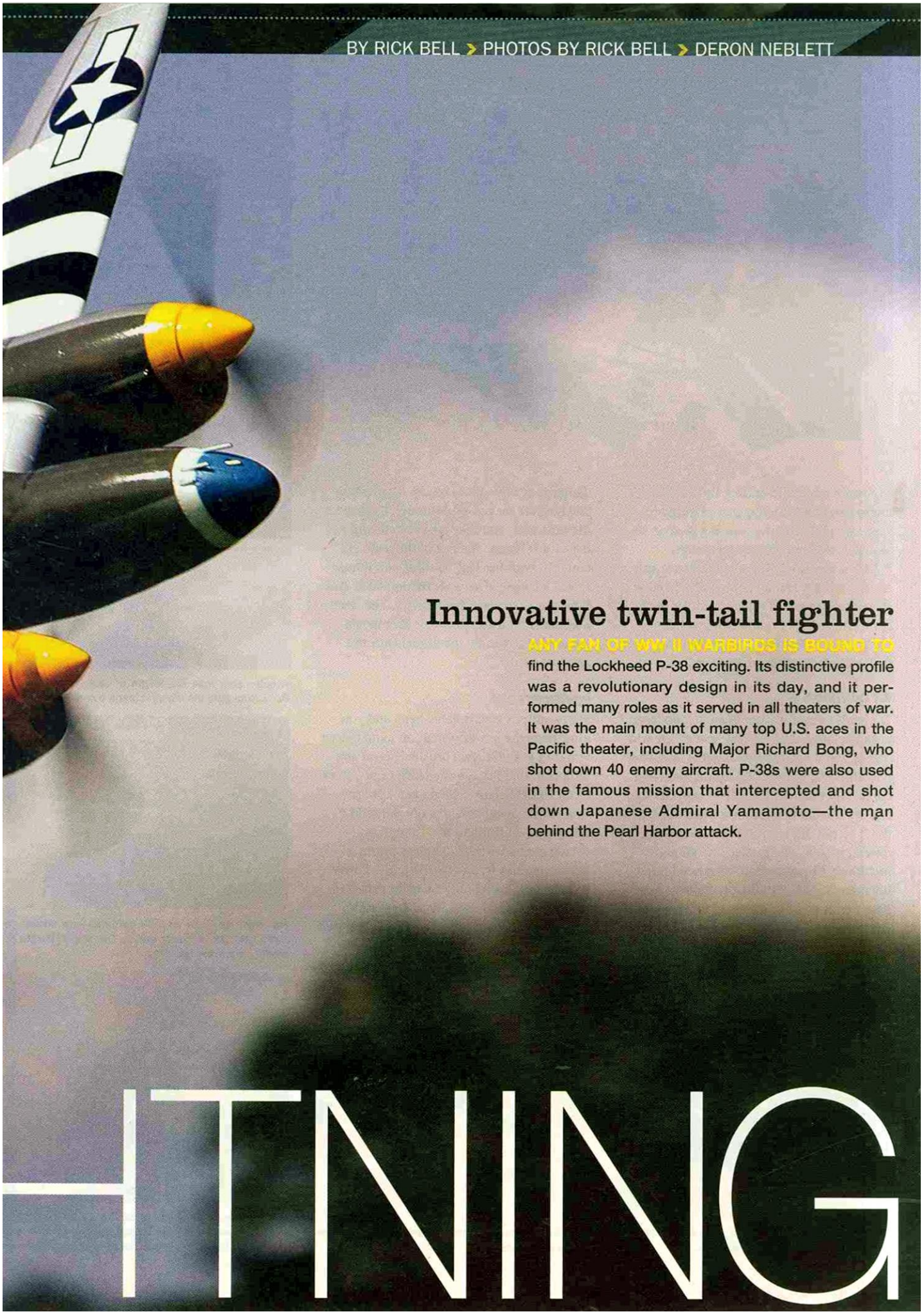
"The Flying Styro P-38 is an amazing, well-engineered model."



HOBBY LOBBY

P-38 LIG

BY RICK BELL > PHOTOS BY RICK BELL > DERON NEBLETT



HTNING

Innovative twin-tail fighter

ANY FAN OF WW II WARBIRDS IS BOUND TO find the Lockheed P-38 exciting. Its distinctive profile was a revolutionary design in its day, and it performed many roles as it served in all theaters of war. It was the main mount of many top U.S. aces in the Pacific theater, including Major Richard Bong, who shot down 40 enemy aircraft. P-38s were also used in the famous mission that intercepted and shot down Japanese Admiral Yamamoto—the man behind the Pearl Harbor attack.

SPECIFICATIONS

MODEL: P-38 Lightning
MANUFACTURER: Flying Styro
DISTRIBUTOR: Hobby Lobby Intl.
TYPE: scale electric warbird
WINGSPAN: 43.75 in.
WING AREA: 243 sq. in.
LENGTH: 30 in.
WEIGHT: 23.5 oz.
WING LOADING: 13.9 oz./sq. ft.
MOTORS REQ'D: 2 brushless (Speed 300 size)
RADIO REQ'D: 3-channel w/3 microservos (ailerons [2], elevator, throttle)
FLIGHT DURATION: 20 min.
PRICE: $199

COMMENTS

The Flying Styro P-38 Lightning is a well-detailed model with superb flight characteristics. The kit provides many vacuum-formed, scale detail parts that really dress it up. In flight, the model has the presence of a much larger model.

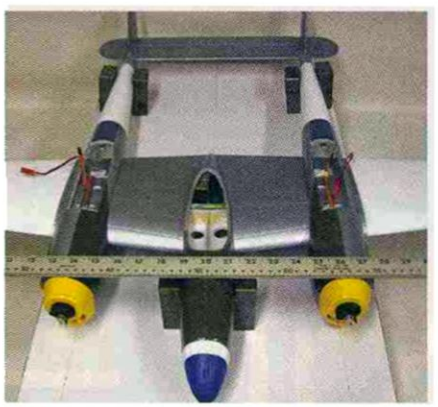
I've wanted to build and fly the P-38 for many years, but the thought of trying to keep two glow engines running in sync has always scared me off. I've seen many P-38s do the deadly one-engine dance and crash, so when Hobby Lobby Intl. debuted the electric-powered Flying Styro kit of the Fork-Tailed Devil at the 2004 Southeast Electric Flight Festival, I knew that my prayers had at last been answered!

KIT CONTENTS

The kit is a combination of an RC model and a well-detailed static display model.The wing halves, stabilizer, fuselage nacelles and center pod are made of molded Depron foam and are factory painted. When you open the box and see the many vacuum-formed parts, don't be put off, as most of them aren't needed for a flyable model. The kit also includes a 14-page, photo-illustrated assembly manual, CNC-cut lite-ply parts, waterslide decals and four colors of touchup paint. For maximum strength, the Lightning is designed as a one-piece model. The battery and receiver are accessed through the bay for the nose gear, and they are covered with a removable hatch. The rest of the radio system is in both fuselage nacelles; you'll need to add a couple of servo-extension leads and Y-harnesses to reach the receiver. The landing gear is for display only; it isn't recommended that you fly the model with the gear attached.

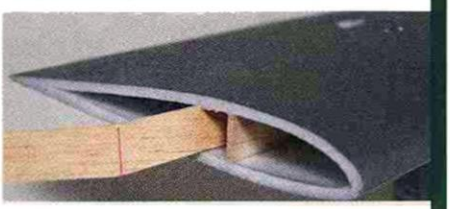
POWER SYSTEM

Many options are available here, and you must have the power system on hand before you start to build. Two brushed Speed 300 motors geared 7.7:1, a single ESC and a 7- or 8-cell NiMH battery will get you airborne with minimal expense. I really wanted to bring the Lightning to life, though, so I decided to use two Axi 2208/34 brushless outrunner motors and two Thunder Power 2-cell, 1300mAh Li-poly batteries (wired in parallel for a total capacity of 2600mAh). Since two brushless motors can't be operated reliably from a single ESC, I used two Jeti Advanced 8A brushless ESCs. I also wired the motors in parallel (see the "Powerlines" column in the June 2004 issue of *Model*

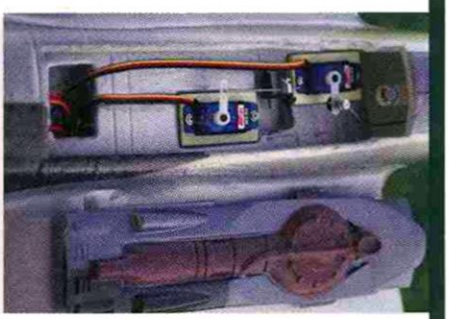


For maximum performance, it's important to properly align the fuselage nacelles.

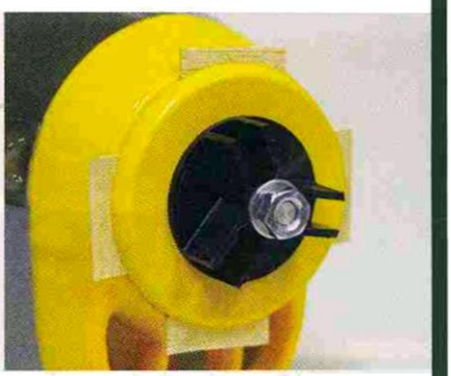
Here are the components needed to assemble one of the power systems.



A balsa spar runs the length of each wing panel. Be sure to glue the dihedral brace behind the spar.



The right fuselage nacelle contains one aileron servo and the elevator servo. The supercharger neatly covers the opening.



I placed 1/32 balsa shims at 90-degree intervals to evenly space the spinner backplate. The firewall is then glued into place inside the fuselage nacelle.

A COUNTRY BOY A LONG WAY FROM HOME

WHEN I FLEW A P-38 FOR THE FIRST TIME, I admit that I had a hard time hearing the engines over the sound of my knees knocking. What was a grassroots pilot like me doing strapped into such a huge piece of iron? Simple: I wanted a type-rating in the airplane (type-ratings are required for aircraft that weigh more than 12,500 pounds empty) because the training would make me a better pilot—a frightened pilot, but a better one.

Like everything else about the Lightning, its boarding method is unique. A little ladder-like thing drops out of the back of the fuselage pod, and you're required to put your feet in the rungs sideways to climb up onto the center section. Once you're up there, you're acutely aware of how big the airplane is because aluminum seems to flow to the horizon. Furthermore, the sides of the cockpit are level with the top of the wing, so you step down into the seat rather than climbing over a fuselage side.

From the cockpit, everything seems different; for instance, the engines block huge chunks of your vision downward and to each side. The usual control stick isn't a stick but a control yoke. You're sitting high over the nose, and you can see directly ahead—a weird feeling for a fighter. Other than the usual instruments, there is nothing about your surroundings that even remotely resembles those of any other fighter.

After you get both Allisons running (a head-trip in itself), you'll find that the nosewheel doesn't steer; you turn the airplane using differential throttle and brakes. Unfortunately, the brakes are incredibly sensitive and powerful, so there's a tendency for newbies (like me) to jerk around.

On takeoff, rather than lurching forward like an artillery shell, it accelerates like a luxury automobile—extremely smooth and insistent. When you bring the yoke back to pick up the nose, however, you must be careful because it's really easy to over-rotate. I had been warned about that, so I had no problem running on the main gear until it flew off at about 120mph indicated.

In the air, the airplane was much more nimble than I had expected, courtesy of the hydraulic ailerons. Also, after a short time, the engines seemed to disappear, and I learned to look around them or move the airplane to see better. I've got to tell you, however, that it pegged my grin meter to look out at those two big engines and know I was actually flying a P-38.

The landing was far easier than I had expected. Even on my first landing, the airplane dutifully squatted onto the mains and let me hold its nose up until I was ready to let it down. Then, I touched the brakes and started jerking around again.

So now, my ticket has L-P-38L stamped on it. It's unlikely I'll be flying a Lightning anytime soon, but at least I've been there; plus, the type-rating makes for terrific conversation at parties.

—Budd Davisson

Visit Budd on the Web at airbum.com.

Airplane News for more information) and used a Y-harness to connect both ESCs to the receiver. I disabled the battery-eliminator circuitry (BEC) of one of the ESCs by removing the red wire (power) from the receiver plug.

LET'S BEGIN!

Because the P-38 is a lightweight foam model, select your adhesives carefully. I used a combination of UHU Por foam-safe contact cement (available from Hobby Lobby), Bob Smith Industries foam-safe thin CA and kicker and a little 5-minute epoxy. Basic assembly goes quickly; the level of detail you add to the model is up to you.

Start the assembly by joining the wing panels. The wing is molded in halves that contain a balsa spar for strength. A balsa dihedral brace is glued to the rear of the spars. To join the panels, I used a thin smear of epoxy here and on the wing roots. The ailerons are prehinged, and the torque wires for them are in place.

The center pod now fits to the wing. Be sure to accurately center it, as it will be used to position the fuselage nacelles later. Use a couple of large T pins to hold the pod in place when you mark the wing for the center-section cutout. After the pod has been glued into place, add the balsa floor in the nose of the pod; the rear edge of it is glued onto the leading edge of the wing.

Fuselage nacelles Before the nacelles are installed on the wing, the motors have to be mounted to the firewalls and glued into the nacelles. The precut firewalls are designed for the 7.7:1 gearboxes and Speed 300 motors, but two lite-ply discs are supplied for other motor configurations. I used Axi radial mounts to attach the motors to the center of the discs and then glued them to the firewalls. When I fitted the prop hubs to the prop adapters, I ran into a slight problem: the holes are too large. A 6mm-o.d. bushing is needed for each prop hub to properly center them. I found that by shrinking two layers of 3/16-inch heat-shrink tubing on the adapter

HIGHLIGHTS

- Very well detailed
- Excellent molding
- Flies great

shaft, the hubs were perfectly centered. After placing the firewall/motor/ESC assemblies in the nacelles, use the spinner backplates as a guide to position the firewall. I placed 1/32-inch balsa shims every 90 degrees to evenly space the backplates before gluing the firewall into the nacelles.

The nacelles are now glued onto the wing along with the stabilizer. The center of the nacelles is spaced 6 3/8 inches from the center of the pod. Draw reference lines on the bottom of the kit box to use as a guide.

Radio installation Three servos are needed for the ailerons and elevator; I used Hitec HS-55 sub-microservos. They are installed in recessed ply mounts in each wing panel, and the superchargers are cleverly disguised access hatches. I used small, rare-earth magnets to hold them in place. The other radio components are installed as follows: I used double-sided tape to secure the ESCs in the nose of the nacelles, attached the batteries to the underside of the balsa floor in the center pod and fastened the receiver to the underside of the wing in the center pod with Velcro® and fastened the receiver to the underside of the wing in the center pod. There's plenty of space to thread the Y-harnesses and servo extensions through the wing and into the center pod.

Final details To complete the look of the P-38, some of the plastic parts need to be trimmed and fitted. They include the six (!) wing fairings, the four fuselage radiators and the canopy. The canopy consists of two parts: the clear, inner glass and a painted outer frame, which requires a fair amount of work; all of the windows must be cut out of it before it's glued to the outside of the clear glass. It sure looks great when finished, though. The water-slide decals add the final touch. They are delicate; just be sure to use plenty of water and then float them into place. Let them dry for 24 hours before handling.

The center of gravity (CG) is 1 1/2 to 1 3/4 inches behind the leading edge of the wing. For the first flights, I set the ailerons for 1/2-inch up-and-down movement and the elevator for 1/4 inch up and down; these are the recommended starting control throws.

SUMMARY

The Flying Styro P-38 is an amazing, well-engineered model. Who would have thought a molded-foam model could look and fly so well? It's nice to see a company take advantage of small, electric-power systems and design a model of one of the most important fighters of WWII.

See the Source Guide on page 137 for manufacturers' contact information.

GEAR USED

MOTORS: 2 Axi 2208/34 brushless (wired in parallel)

BATTERY: 2 Thunder Power 2-cell, 1300mAh Li-polys (wired in parallel)

RADIO: Hitec Focus 3 transmitter, Hitec 555 receiver, 3 Hitec HS-55 sub-microservos, 2 Jeti Advance 8A brushless ESCs

IN THE AIR

CONTROL THROWS

Aileron: ±1/2 in. low; ±3/4 in. high; 25% expo

Elevator: ±1/4 in. low; ±1/2 in. high; 25% expo

GENERAL FLIGHT CHARACTERISTICS

Stability: the P-38 is a very stable warbird that goes where you point it and is very solid throughout all throttle settings.

Control response: on low rates, the plane is mild mannered; on high rates, the P-38 is very agile and performs warbird-type maneuvers with ease.

Tracking: the P-38 tracks very well and handles mild breezes and cross-winds without difficulty.

Aerobatics: in true warbird fashion, the P-38 does scale-like aerobatic maneuvers with ease. Loops, rolls and inverted flight are all possible and fun to do.

Glide performance: with its thick airfoil and highly tapered wing, the P-38 glides slowly and predictably.

Stall characteristics: the P-38 is very stall-resistant, but when it does stall, it's a non-event.

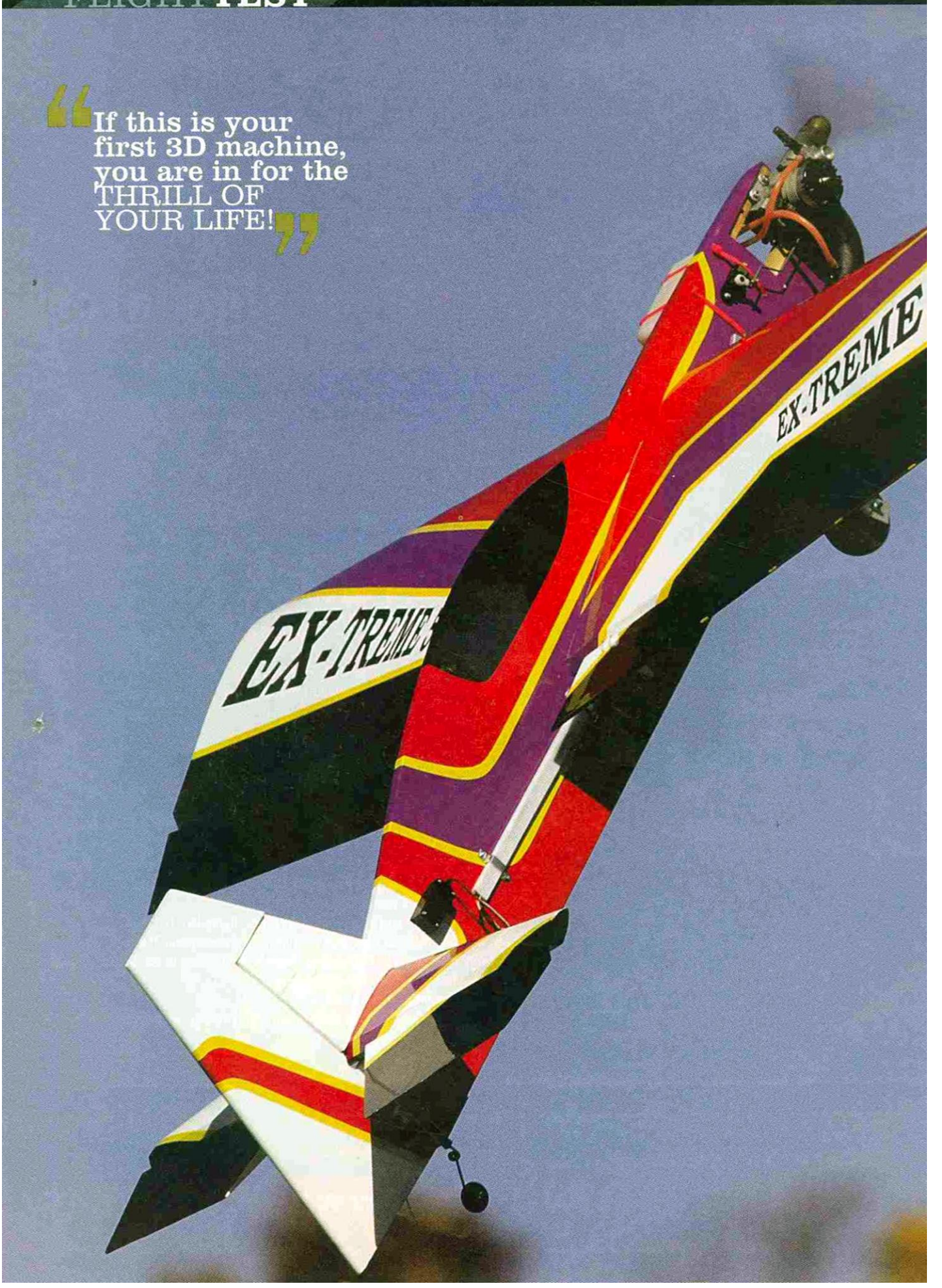
PILOT DEBRIEFING

I have to admit that I was a little nervous about the first flight because this was my first twin-powered model. I am happy to say that my apprehension was totally unfounded; it hand-launches easily with 1/2 throttle. This little plane flies like a veteran! After a circuit or two to sort out the trim, I was perfectly at ease carving up the sky.

The P-38 needs to be belly-landed, and the model has no problems here. I recommend that you keep a click or two of throttle until you flare it just before touchdown. The plane has a moderate wing loading, but in flight it feels like a much larger model with a light wing loading. During slow passes for the camera, the model was rock solid, and I never had any fears that it would stall. The Lightning grooves nicely at full throttle. The motor/battery/prop combination that's recommended gives the plane good vertical performance and excellent speed.

Because this plane is a warbird, I expected it to perform warbird maneuvers. Roll response was a little on the light side, and elevator was right on the money—responsive but not too sensitive.

The P-38 has plenty of power and will loop from level flight. Other maneuvers such as Cuban-8s, reverse Cuban-8s, point rolls and inverted flight are well within the Lightning's flight envelope.


"If this is your first 3D machine, you are in for the THRILL OF YOUR LIFE!"
EX-TREME
EX-TREME

BY CRAIG TRACHTEN > PHOTOS BY PETE HALL

Experience profile 3D excitement!

IT'S FUNNY HOW THINGS WORK OUT SOMETIMES. A few years ago, I reviewed the Carl Goldberg Products Ex-Treme 330, a sister ship to the profile Edge 540. My son and I flew that aircraft at least once a week until I performed a perfect 10-foot maneuver with only 9 feet of altitude. Just two weeks after that unfortunate accident, *Model Airplane News* asked me to review the Ex-Treme 540. I couldn't say yes fast enough! Like the Ex-Treme 330, the Ex-Treme 540 features a profile fuselage with all-wood construction, iron-on covering and dual-aileron control. It comes with duraluminum landing gear, wheels, hardware, a fuel tank and an engine mount for the recommended .32 to .46 2-stroke or .40 to .63 4-stroke. I couldn't wait to get this one in the air!

CARL GOLDBERG PRODUCTS

EX-TREME 540

SPECIFICATIONS

MODEL: Ex-Treme Edge 540
MANUFACTURER: Carl Goldberg Products
DISTRIBUTOR: Great Planes Model Distributors
TYPE: profile aerobat
LENGTH: 48 in.
WINGSPAN: 45 in.
WING AREA: 703 sq. in.
WEIGHT: 82 oz.
WING LOADING: 16.8 oz./sq. ft.
ENGINE REQ'D: .32 to .46 2-stroke or .40 to .63 4-stroke
RADIO REQ'D: 4-channel with 5 servos
PRICE: $150

COMMENTS

With a profile fuselage, built-up one-piece wing, airfoiled empennage and extra-large control surfaces, the Ex-Treme Edge 540 was designed for performance.

HIGHLIGHTS

- Fun to fly
- Easy to assemble
- Complete hardware package

WING ASSEMBLY

The parts count of this ARF is low, so it's a rather quick build, and considering that this was déjà vu all over again, I barely needed the instructions. I started by test-fitting the wing to the fuselage. The wing fit was a little too tight, so I sanded the opening in the fuselage for a more comfortable fit. I marked where the wing sits on the fuselage and then removed the covering from the wing in that area. I laid the fuselage on its side and marked and drilled the mounting holes for the landing gear.

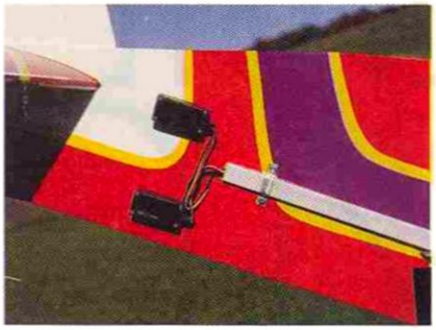
The next order of business is to install the aileron servos in the wing. The output shafts of your servos should be toward the leading edge of the wing. Three of the four servo screws are easy to install, but you'll need a thin screwdriver for the fourth because it sits under the hatch-mounting tab and has to be put in at an angle. Now place a servo arm on each servo (each pointing inward toward the fuselage). Mark the pushrod line, and cut a 1⅜-inch-long slot in the wing as the pushrod exit. Now it's time to epoxy the wing to the fuselage.

TAIL FEATHERS AND LANDING GEAR

Heading south, it's time to attach the horizontal stabilizer to the fuselage. As you did with the wing, test-fit and sand the tail if necessary. Mark the fuselage line, remove the covering from that area of the stabilizer, then epoxy it into place. When it has cured, mount the tailwheel bracket. Head north and mount the main gear. The documentation instructs you to attach the wheels at this time, but I do this just before I set the CG. If you set the plane on its wheels too long, they will develop a flat spot: bump-bump-bump down the runway!

It's critical that you correctly mark and drill the joiner for the elevator; if you don't, the elevator will be misaligned. Don't panic if you goof, though; on another plane I built with this same setup, I fixed the problem by slightly over-drilling the

The Megatech M-46 with MAC tuned muffler and APC 12.25x3.75 prop is a great combination that really hauls the model around the sky.



This neat conduit that keeps the rudder and elevator servo leads out of harm's way is supplied with the kit.

The rudder and elevator pushrods are short and direct for a tight, slop-free control system.

The fuel tank is installed on the left side of the fuselage, secured with nylon zip-ties and cushioned by foam rubber.

The receiver, its battery and the aileron servos are installed in the wing under removable hatches.

holes, clamping both elevator halves between two boards, filling the holes with epoxy and then pushing in the joining wire. That aircraft still flies.

Affix the elevator, rudder and ailerons to their respective locations with the supplied CA hinges. Bob Smith's flexible CA (BSI-119) applied with a fine pipette (BSI-322) works well for this. Attach the control horns and the aileron pushrods. Mount your receiver battery in the left wing and the receiver in the right. I used a few Popsicle sticks to secure these in place. The elevator and rudder servos are mounted aft, near the empennage. A flat wire chase helps you to run the servo leads up front. You'll need servo extensions, and I also added heat-shrink tubing to ensure that the extensions wouldn't separate during flight.

I assembled and secured the tank to the side of the fuselage using zip-ties. I then mounted the wheels. Before I mounted my Megatech M-46 with a MAC tuned muffler, I placed the engine/muffler in the mounting slot, placed the aircraft on my Great Planes CG Machine and slid the engine back and forth to achieve the desired CG. I set mine at the aft limit of the recommended CG. I needed to add 4 ounces of weight to the beak of this bird and used a microservo for the throttle up front. If this is your first 3D aircraft, move the CG to the forward limit until you get used to its flying characteristics.

Having had some experience with profile fun-fly planes and knowing that I might make a few harder-than-normal landings and touch-and-go's, I always run a stiffener between the landing-gear mains to add strength to the assembly. Set the control throws, then go out, fly safe, and have fun.

GEAR USED

RADIO: Futaba 9C and Futaba S-148 servos

ENGINE: Megatech M-46 w/ MAC tuned muffler

FUEL: Wildcat 15% 2&4 Cycle

PROP: APC 12.25x3.75

LAST WORD

The Carl Goldberg Products Ex-Treme Edge 540 is an easy-to-assemble ARF that comes with high-quality parts and hardware. I guarantee that after you've built it, you'll want to fly it all the time! It's so much fun to fly, it should be illegal. See you at the field!

See the Source Guide on page 137 for manufacturers' contact information.

click trip MODELAIRPLANENEWS.COM TO SEE THE 540 IN ACTION

IN THE AIR

The Ex-Treme Edge 540 loved the Megatech .46 turning an APC 12.25x3.75 prop. The MAC tuned muffler gave this combo a nice kick in the tail. If this is your first 3D machine, you are in for the thrill of your life. The 540 is pure fun.

CONTROL THROWS

Elevator: ±2 in. (high); ±1¼ in. (low); expo: 60%

Aileron: ±1⅞ in. (high); ±1 in. (low); expo: 60%

Rudder: ±2¼ in. (high); ±1¼ in. (low); expo: 60%

GENERAL FLIGHT CHARACTERISTICS

Stability: for an aircraft with a relatively short wingspan, the 540 is remarkably stable. When it's under power, you have to go out of your way to stall this aircraft.

Control response: in a word: awesome!

Tracking: with a little fine-tuning, the 540 tracks exceptionally well. Level flight is hands-off; inverted needed a touch of down-elevator pressure (I prefer this). Knife-edge needed a little tweaking, as the 540 had a tendency to tuck.

Aerobatics: how good are you? The 540 will take all you can give it and make you look good in the process. My 540 thinks it's a helicopter!

Glide performance: for a short wing, it glides very well. If you dead-stick, keep its speed up and nose down. As long as you have forward motion, you will be able to control the aircraft.

Stalls: these are nonviolent and easy to recover from. The nose will mush over and go nose-down. Add a little power, and off you go.

PILOT DEBRIEFING

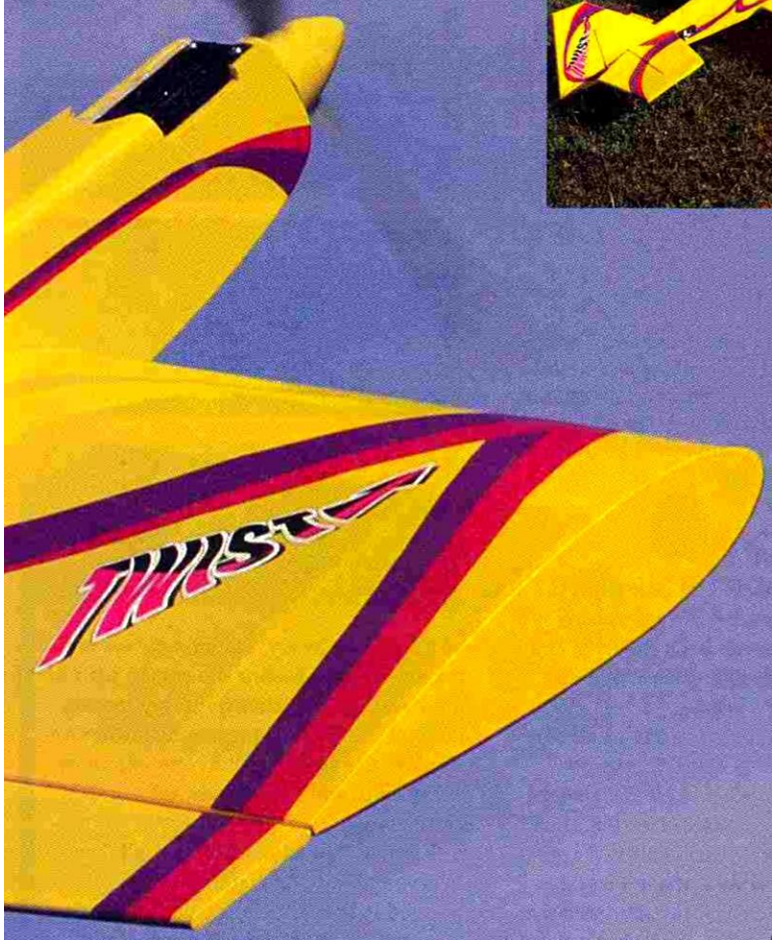
Goldberg's Ex-Treme 540 is what it claims to be. With a small parts count, it is a quick, simple build. As for flying, it lives up to its name: Ex-Treme. Its light wing loading helps it jump off the ground. Loops can get so tight that you will swear the prop is going to bite its own tail. It rolls so fast, you don't have time for elevator input when inverted; it isn't needed! After a five-roll, high-speed pass, it loses a minimum of altitude. 3D is what this aircraft is about. The last two pages of the documentation describe four different maneuvers. My favorite—hovering—isn't listed. I like to fly in at idle, pull up-elevator and hang it on the prop in the middle of the field. It's at about ½ throttle at that point. At ¾ throttle, it will climb, so throttle control is imperative. The 540 does not tail-slide well, so if I lose the hover, I won't try to recapture it. I'll throttle up, go around and fly back to the hover. As with all things new, altitude is your friend, so practice high.

> "Hit high rates, and the Twist turns into an aerobatic animal!"

HANGAR 9

TWIST

BY RICK BELL > PHOTOS BY RICK BELL & PETE HALL



An exciting aerobat for glow or electric power

IN A SEA OF ALMOST-READY-TO-FLY (ARF) models, the Hangar 9 Twist 3D .40 ARF is a standout. It's a great-flying, glow-powered model that you can easily convert to use clean, quiet, electric power. Because electric power systems have become lighter and more powerful, converting large planes (.40 and up) to electric power has become more and more popular.

In this review, we'll look at the Twist from two angles—glow-powered and electric-powered—and we'll evaluate the power systems and performance of each.

3D.40 ARF

SPECIFICATIONS

MODEL: Twist 3D .40 ARF
MANUFACTURER: Hangar 9
DISTRIBUTOR: Horizon Hobby Inc.
TYPE: fun-fly ARF
WINGSPAN: 47.75 in.
WING AREA: 747.37 sq. in.
AIRFOIL: symmetrical
WEIGHT: 5.4 lb. (glow), 5.8 lb. (electric)
LENGTH: 48.38 in.
ENGINE/MOTOR REQ'D: .40 to .58 2-stroke, .50 to .72 4-stroke, or equivalent electric motor
RADIO REQ'D: 4-channel w/5 servos (2 aileron, elevator, rudder and throttle)
PRICE: $99.99

COMMENTS

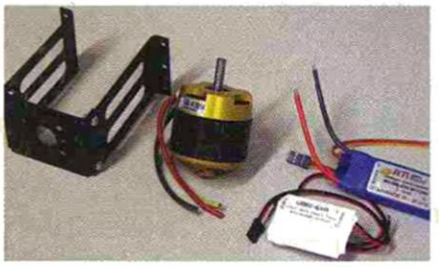
The Hangar 9 Twist is a great, low-cost aerobat. Not only does it fly well and go together quickly, but you can also power it with a variety of systems.

HIGHLIGHTS

Quick assembly
Easy to convert to electric power
Excellent flying model

KIT OVERVIEW

The Twist is a complete kit that you can assemble very quickly. The fuselage, one-piece wing, tail feathers and control surfaces are built out of light balsa and lite-ply and covered with UltraCote. The striking trim scheme was designed for maximum visibility during aerobatics. The control surfaces are oversize, and the counter-balanced rudder and elevators have extreme bevels for large control throws for doing 3D maneuvers. The kit also includes a trimmed canopy, aluminum landing gear, wheels, an engine mount and a hardware package. The instruction manual is easy to follow and contains many photos. In addition to providing detailed instructions on assembly, the manual shows you how to install a 2-stroke engine and a Hacker electric-power system. Even though the specs say you can install a 4-stroke engine, the manual doesn't provide instructions that explain how do that, so you're on your own here.



Here are the components for the electric version of the Twist. The Axi motor is a real powerhouse.

ASSEMBLY NOTES

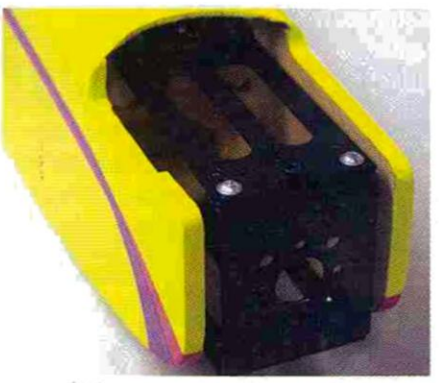
Glow version It takes very little effort to put the Twist together, and there aren't any surprises. In fact, you can build the Twist and have it ready to fly in as little as 6 hours without breaking a sweat.

Assembly starts with the one-piece wing. All you need to do is hinge the ailerons, install the servos and linkages and glue the locating dowel into place. After that, install the horizontal and vertical stabs and control surfaces. A heavy-duty U-shape wire joins the elevators and must be inserted into the fuselage before you slide the stab into place.

The engine installation requires the most work. The Twist's nose is a little on the narrow side, but a 2-stroke .46 fits well. I used an Evolution .46 NT and had no difficulties mounting it. With a 2-stroke engine installed, the Twist tends to be a little tail-heavy. The manual recommends that you mount the engine with its drive washer 4¼ inches from the firewall, but you could move the engine farther forward on the engine mount and eliminate the need to add dead weight to balance the model.

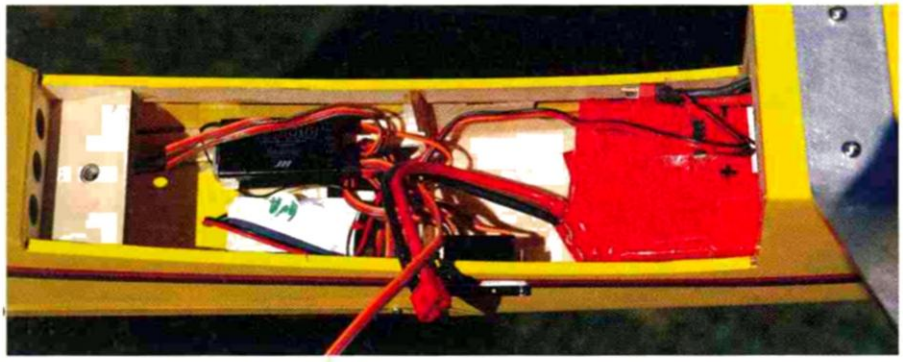
If you use a 4-stroke engine, you'll have to devise a way to attach the throttle pushrod to the carb. You could simply grind a channel on the inside left cheek of the model's nose and use a flex cable for the throttle pushrod.

After you've mounted the engine, attach the landing gear, plumb and install the fuel tank and attach the canopy using your favorite method. I installed the remaining



To mount the motor, I used an aluminum mount designed for the large Axi 4120/14 motor; it fit perfectly on the Twist's firewall.

Above and right: the Twist is well suited to glow and electric power; the installation of both powerplants is simple and straightforward.



In the electric version, there's no need for a throttle servo, so I mounted the receiver and UBEC on the tray reserved for it. To balance the e-version, I needed to slide the battery into the radio compartment.

The radio installation in the glow version is very straightforward and uncomplicated.

radio gear and linkages and set them up according to the instructions. When I balanced the model, I needed to add 2 ounces of lead to get the center of gravity (CG) in the middle of its range.

Electric version Electric conversions often involve a lot of modifications to the firewall and airframe to make room for the electric motor and battery, but the Twist required very few changes. Assembly was the same as it was for the glow version with a couple of exceptions. To accommodate the smaller servos that I planned to use in the electric version, I used plywood to fill in a portion of the servo openings in the wing and fuselage and then screwed the servos into place.

The fuselage is where you will make most of your modifications, but you don't need to do that much work to make the conversion complete. Foremost, cooling air needs to flow into and out of the fuselage; I enlarged the fuel-tank hole in the firewall. I drew a circle centered over the original hole and used a Dremel tool fitted with a sanding drum to enlarge it. I also opened up some holes in the bottom of the fuselage by trimming away the covering from some of the lightening holes. I had to make room for the Li-poly battery that I placed behind the firewall where the fuel tank would normally be. I made the opening larger so I could move the battery fore or aft to adjust the CG. After that, I attached the motor mount to the firewall with 6-32 bolts and blind nuts (it was a drop-in fit) and ran the motor wires into the fuselage. I then finished the model and set the CG and control throws the same way as I did with the glow-powered model.

E-POWER REQUIREMENTS

When converting a glow-powered model to an electric one, a lot of factors come into play—especially when you select a motor. Before you choose the power system, you must decide on the type of performance you want from the model. Fortunately, there is a simple way to determine the power requirements for the performance you want (see the "Determining watts" sidebar). With a 2-stroke glow engine installed, the Twist will weigh between 5 and 6 pounds (mine weighed 5.4 pounds, or 84 ounces). So that means for good aerobatic performance with an electric system, the plane needs a minimum of 100 watts of power per pound.

Based on the performance desired, here's a list of the components and their weights that I used for the conversion.

- Axi 4120/14 brushless outrunner motor (11.28 ounces)
- Axi aluminum motor mount (1.55 ounces)
- Jeti Advance 70A Opto electronic speed control (ESC) (1.7 ounces)

DETERMINING WATTS

You can predict a model's performance by the number of watts of energy produced versus the weight of the model. Electric-flight trendsetter Keith Shaw developed this method many years ago. He surmised that for a trainer-type model to take off and cruise around, it would require a system that generated about 50 watts per pound. Basic aerobatics require 70 to 80 watts per pound. To achieve very good aerobatic performance, the power system must be capable of producing 100 watts per pound. Today's 3D-capable models require systems that pump out more than 140 watts per pound. You can calculate watts by multiplying amps (current) by volts (W=AxV).

So the question becomes, how do you determine the watts your system produces? A good tool to use is the AstroFlight Super Whatt meter. It measures watts, amps, volts and total ampere-hours flowing through the circuit. Knowing the number of watts that a specific motor system generates will allow you to determine the type of performance you can expect.

WHAT IS THE ULTIMATE BEC?

Some of you might have noticed that I haven't mentioned the electric Twist's receiver battery. As I was using an Opto-isolated ESC (an ESC without a battery-eliminator circuit [BEC]), this is where the Ultimate BEC (UBEC) comes into play. It's an external circuit that takes power from the battery and regulates its voltage to power the receiver and servos; it eliminates the need for an onboard receiver pack. The UBEC can power 8 to 10 servos—perfect for large E-power models. It's wired to the input (battery) side of the ESC and can be plugged into any free receiver channel, or you can plug it into a receiver switch so the system isn't on when the battery is plugged in. If no free channel is available, you can use a Y-harness to attach it to the throttle channel.

IN THE AIR

CONTROL THROWS

Aileron: ± 1 in. low; ± 1 5/8 in. high; 30% expo
Elevator: ± 1 in. low; ± 2 in. high; 25% expo
Rudder: ± 1 3/4 in. low; ± 2 in. high; 20% expo

GENERAL FLIGHT CHARACTERISTICS

- **Stability:** the Twist is a "go where you point it" model. It flies as well inverted as it does upright.
- **Control response:** on low rates, the plane is mild-mannered; on high rates, the Twist turns on a dime and is very agile.
- **Tracking:** the Twist tracks very well and handles crosswinds easily.
- **Aerobatics:** this is what the Twist lives for. Any way you push the sticks, the Twist follows without hesitation.
- **Glide performance:** its thick airfoil provides a slow, predictable glide.
- **Stall characteristics:** the Twist is very stall-resistant, but when it does stall, it's a nonevent.

PILOT DEBRIEFING

I first flew the glow-version Twist, and in a word—wow! Takeoffs were quick, and it floated in for landings. Aerobatics are very easy. Want to do a loop? Just pull back on the elevator stick; response is immediate. Low-control rates are perfect for sport flying and basic aerobatics. Hit high rates, and the Twist turns into an aerobatic animal! Rolls are blindingly fast and are nearly the length of the fuselage. With an aft CG, the Twist becomes a capable 3D mount. Even though I used a .46 2-stroke, the Twist was able to hover and pull out well.

The electric Twist flew as well as the glow-powered version, despite the extra 4 ounces of weight. I set the models up the same way, so the only difference between them was their power systems. The quiet Axi motor makes a lot of power and can handle sustained throttle when needed. Vertical performance is very good but not unlimited. What I really like, though, is that the plane doesn't get oily and is clean at the end of a flight!

GEAR USED

RADIO EQUIPMENT: JR XP8103 transmitter, JR NER-649S receiver and 5 NES-537 servos

ENGINE: Evolution .46 NT

FUEL: Cool Power 15%

PROP: APC 12.25x3.75

RADIO EQUIPMENT: JR XP8103 transmitter, JR 610M micro-receiver, 4 Hitec HS-85MG servos, Jeti Advance 70A Opto ESC, Kool Flight Systems Ultimate BEC

MOTOR: Axi 4120/14 brushless outrunner

BATTERY: Kokam 4S2P 8,000mAh Li-poly, 20C high discharge

PROP: APC 15x8E

- Kool Flight Systems Ultimate BEC ("UBEC"; 0.7 ounce)
- Kokam 4S2P 8000mAh high-discharge, Li-poly battery (19.22 ounces)
- JR 610M micro-receiver (0.38 ounce)
- 4 Hitec HS-85MG metal-gear servos (0.77 ounce each; 3.08 ounces total)

During the conversion, one of my goals was to keep the Twist as light as possible, and I was shooting for the same total weight as the glow-powered Twist. Before I started construction, I weighed the two airframes and the two power systems. The airframes were within 1 ounce of each other (41.69 ounces and 42.57 ounces); I used the lighter airframe for the conversion. The Evolution .46, the muffler and the engine mount weighed 18.94 ounces, and the motor and its mount weighed 12.83 ounces.

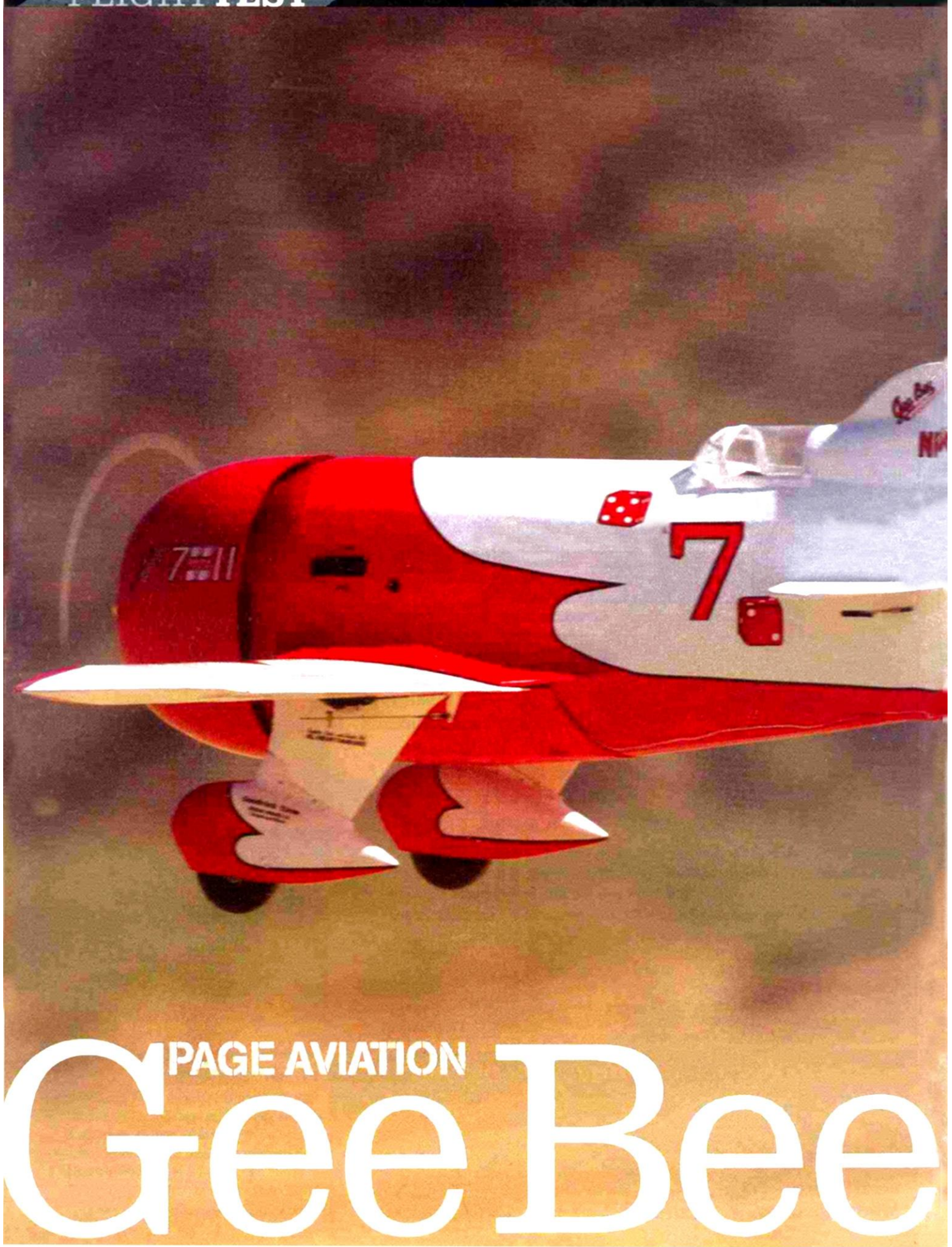
I also saved weight in the radio system. In the glow version, I used 5 standard JR NES-537 servos, an NER-649S standard-size receiver and a 4-cell 1,400mAh receiver battery for a total weight of 13.65 ounces. The electronics for the conversion weighed only 5.86 ounces—a difference of 7.79 ounces. So far, the electric Twist weighed 14.78 ounces less than its glow-powered counterpart (69.22 versus 84 ounces). Add the weight of the battery (19.22 ounces), and the converted Twist's total weight is 88.44 ounces—only 4.44 ounces more than the glow-powered version with an empty tank. This looked promising, as I expected the Axi motor to deliver around 60 amps and 800 watts of power.

CONCLUSION

The Hangar 9 Twist is an all-around fun plane to fly. It's well built of high-quality materials and can be assembled quickly and easily. Its light airframe lends itself well to .46 2-stroke engines or clean, quiet electric power, and it's extremely simple to convert the Twist to E-power. Best of all: the Twist flies great! Get one and find out for yourself!

See the Source Guide on page 137 for manufacturers' contact information.

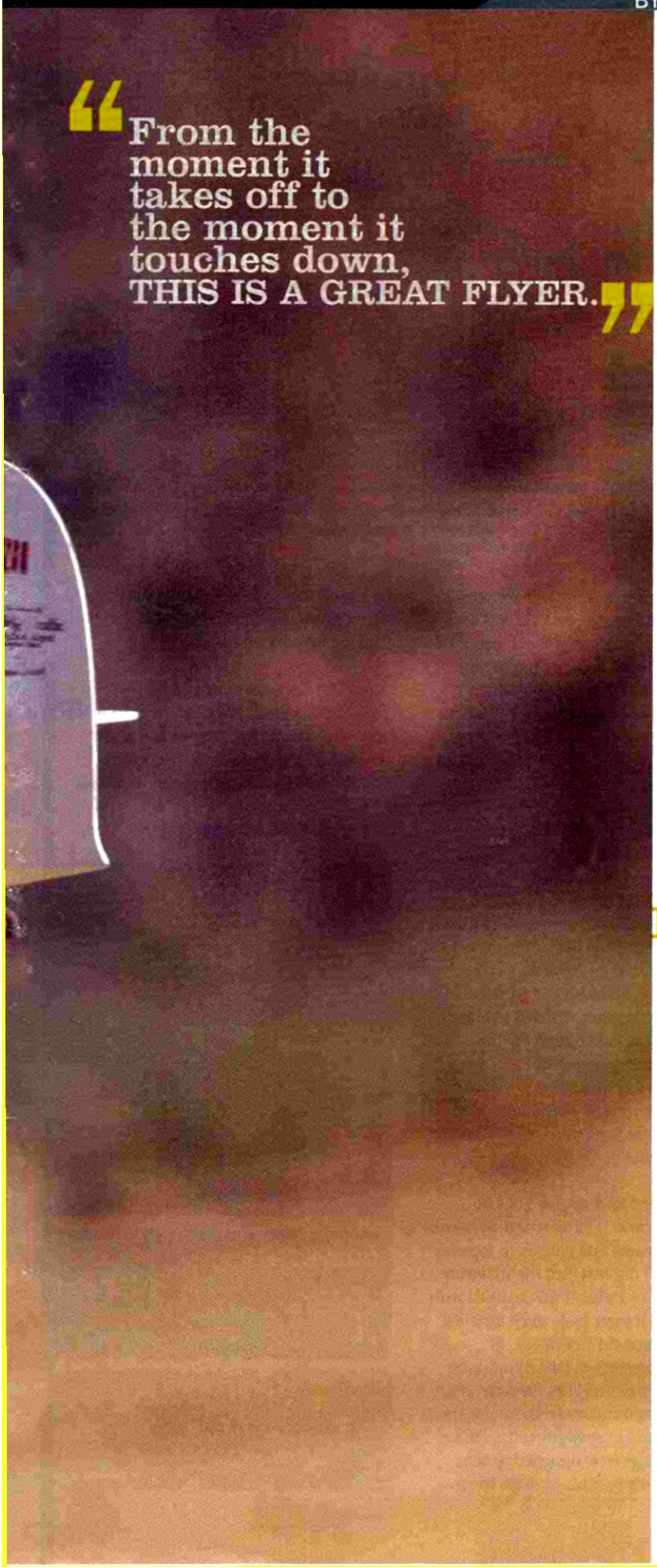
click trip MODELAIRPLANENEWS.COM TO SEE THE TWIST IN ACTION



PAGE AVIATION

Gee Bee

BY ROBERT REID > PHOTOS BY JOHN REID

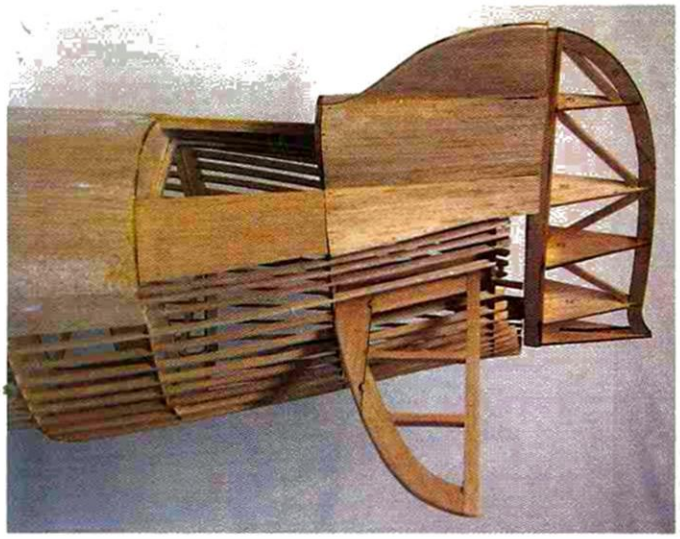


"From the moment it takes off to the moment it touches down, THIS IS A GREAT FLYER."

Build a piece of history

WITH THE 1932 THOMPSON TROPHY RACES looming, Granville Brothers Aircraft took a chance on hiring newly minted engineer Howell W. "Pete" Miller. Under the tutelage of the eldest Granville brother, Zantford (known as "Granny"), Miller and the other Granville brothers set out to build two new planes for the upcoming races. They were Models R-1 and R-2, and both were to be powered by engines borrowed from Pratt & Whitney.

The R-1 was designed around the new R-1340ci 9-cylinder, 800hp engine. Built for all-out speed, it was to compete on the short-range Thompson Trophy pylon-racing course. The R-2 was destined for the longer Bendix Trophy race, so it was designed around the R-985ci, 535hp P&W engine, which burned less fuel than its bigger brother; this allowed the R-2 to fly faster and make fewer stops. Other than their engines, the central difference between the two was that the R-2 held 302 gallons of fuel for the longer course, while the R-1 held only 160.



You can see why the fuselage instructions must be followed carefully: the fin is incorporated in its construction. Any misalignment will result in a plane that won't fly completely straight.

Notice the optional two-piece fiberglass wheel pants and the epoxy reinforcement around the wheel opening. A combination of aircraft ply and fiberglass makes for a very scale landing gear.

THE KIT

I have been a fan of the Gee Bee for a long time, and I jumped at the opportunity to review Page Aviation's kit. The rolled plans consist of two sheets of detailed drawings. The 14-page instructions include a parts list, detailed instructions and 49 photos showing various stages of construction. A two-piece fiberglass cowl, precisely laser-cut wooden parts, plastic wheel pants, a sheet of good-quality decals and all the necessary hardware complete the package. You can also purchase optional fiberglass wheel pants; they're very durable and are great for grass flying fields on which the runways are inevitably bumpy. To improve the Gee Bee's scale looks, a plastic dummy engine that fits inside the cowl is also available from Page Aviation.

CONSTRUCTION

Wing Construction starts here; it was neat to be able to fit the parts together and see how they looked before gluing them. I had both panels framed in about an hour, and I did the finish-sheeting and wingtips the next day. The wing houses the two aileron servos. Install a paper tube for the wing servo leads; it makes it much easier to thread the leads through the wing. I joined the panels, giving them 2½ inches of dihedral as called for on the plans, and then I fiberglassed the center section. You will construct the belly pan after you've built the fuselage.

Fuselage frame Carefully punch out the fuselage parts and then join them with clothespins (I used about 40). At this point, the fuselage is very fragile, so be careful. After you've glued on the top and side formers and added a few stringers, the fuselage will be very strong. I also made sure that I shimmed in 3 degrees of right thrust for the engine.

Next, I sheeted the body; the ¼-inch sheeting that goes around the fuselage nose to the firewall required a little persuading. Follow the instructions; soak it in water and tape it to an appropriate form until it has dried. Be sure to extend the fuselage stringers past the last former by 1 inch because the rudder will fit inside these stringers. The fin is built as part of the body, and if you don't follow the instructions, the rudder won't be straight. Mount the wing on the body and install the belly formers; use wax paper to keep the wing/belly pan and fuselage separate. I molded wet balsa around a piece of ⅝-inch-diameter dowel to make a set of wing-bolt tubes. I coated the tubes with epoxy to strengthen them.

Making the wing fillets isn't difficult; it just takes a little time. A plastic front fillet for the scale shape is supplied, so you don't have to make one.

Tail feathers and landing gear The tail-feather construction is fairly straightforward: punch out the parts, and glue them together over the plans. I dry-installed the stabilizer to check its fit, and when I was satisfied with that, I set the stabilizer aside to be installed after I had covered the fuselage.

Using the plans for reference, adjust the prebent gear legs so they'll fit properly, strap them to the wings, and solder them together; I used copper wire to strengthen the solder joints. The fairings were designed to be as true to scale as it's possible to make them. It's a good idea to get the wheel alignment correct by assembling the wheel pants before you glue the rear pant to the fairing.

Cowl The fiberglass cowl comes in halves that must be joined. I cleaned the mating surfaces with acetone (lacquer thinner works too) before I joined the halves with Zap's Fiber Epoxy. I installed the motor on its side, bolted the pie-shaped cowl mounts to the firewall and positioned the cowl over them.

SPECIFICATIONS

MODEL: Gee Bee R2
MANUFACTURER: Page Aviation
TYPE: sport racer
LENGTH: 35 in.
WINGSPAN: 60 in.
WING AREA: 600 sq. in.
WEIGHT: 6½ lb.
WING LOADING: 25 oz./sq. ft.
RADIO REQ'D: 4-channel
ENGINE REQ'D: .60 2-stroke or .91 4-stroke
PRICE: $139.95

COMMENTS

The Gee Bee is rock-solid in the air, but landings require a delicate touch on the elevator to avoid having it nose over.

HIGHLIGHTS

- Accurately laser-cut parts
- Easy to assemble
- Light

IN THE AIR

I equipped my Gee Bee with a Tower Hobbies .75 2-stroke engine, a Pitts muffler, Wildcat 15-percent-nitro fuel and a 13x6 Master Airscrew prop. I used an Airtronics RD6000 radio. The .75 supplied more than enough power. The takeoff run was about 75 feet, and climbout was smooth and straight.

CONTROL THROWS

Elevators: ±7/16 up/down
Ailerons: ± ½ up/down
Rudder: ±¾ left/right
Expo: none

GENERAL FLIGHT CHARACTERISTICS

Stability: this plane is very stable and doesn't show any bad characteristics.
Tracking: the plane goes where you point it without deviating.
Aerobatics: the Gee Bee will do loops, rolls, inverted flight and knife-edges with ease.
Glide performance: it has excellent glide ratio; it could almost be categorized as a "floater."
Stalls: the Gee Bee doesn't show any tendency to stall; it just mushes along and drops its nose a bit.

PILOT DEBRIEFING

From the moment the Gee Bee takes off to the moment it touches down, it's a great flyer. Because it's a pylon racer, it can make very sharp turns. It can do enough aerobatics to make advanced pilots happy, and it's stable enough for intermediate fliers to be comfortable with it. Takeoffs are fairly easy, but landings require a little skill. I recommend that you land in a 3-point configuration as slowly as you can because a main-gear landing will most likely end in a nose-over. The 3-point landing is easy to accomplish because the plane doesn't show any sign of tip-stalling at slow speeds. The Tower .75 engine provides more than enough power, and climbout is almost unlimited. The glide ratio is very good; I do, however, suggest that you make several slow flybys to become familiar with its sink rate. The Gee Bee is one of the most stable aircraft I have flown.

With all the parts lined up, I tacked the cowl to the cowl mounts with CA; then I removed the cowl (with mounts) and glued the mounts permanently to it using Fiber Epoxy.

Final assembly I covered the plane with Balsa USA Solartex, and I fiberglassed the wing fairings to ensure a smooth finish. I sprayed the model with Rust-Oleum high-gloss paint because it covers well and is fuelproof.

There aren't any number decals in the kit, so I made mine on my computer and printed them on glossy photo paper. I attached them to the wing and fuselage with spray adhesive and then fuelproofed them with a final coat of clear urethane.

There's plenty of room inside the fuselage for the radio, even when using two elevator servos. The plans call for a .60 2-stroke or a .91 4-stroke engine; I selected the Tower .75 in preference to the .61 2-stroke because they weigh the same, but the .75 can swing a bigger prop with a little more power. I didn't want to make a hole in the cowl for the glow starter, so I decided to use a remote glow starter.

One advantage of such a large fuselage is the easy access it provides to all of the radio equipment.

I found that I'd have to add 6 ounces to the nose to balance the plane, so I wrapped my battery pack in foam, put it into a plastic bag and strapped it to the bottom of the engine mount. After moving the battery pack forward in this manner, I needed to add only 2 ounces to the nose.

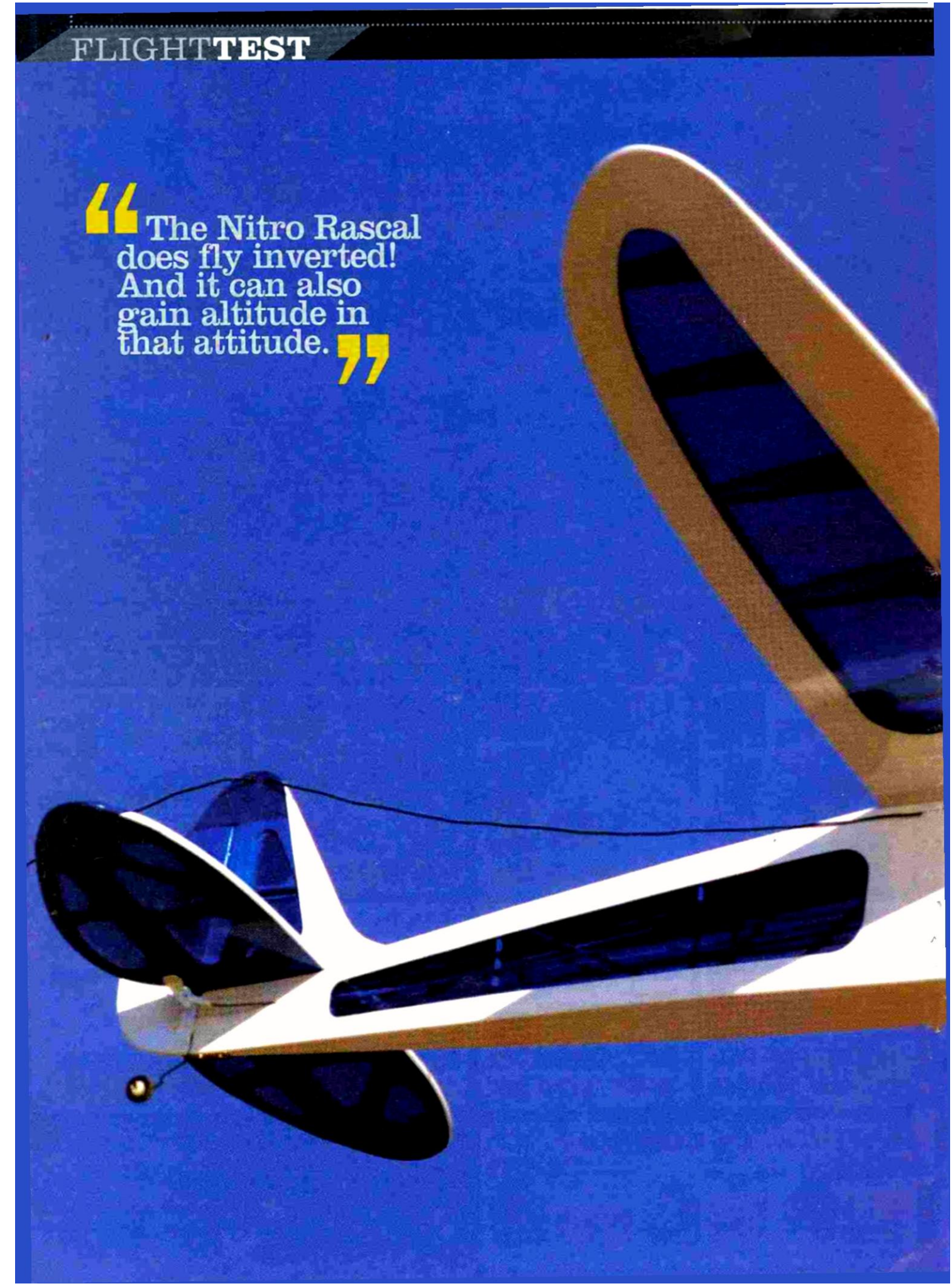
GEAR USED

RADIO: Airtronics RD6000 with 5, 94102 servos (throttle, elevator, rudder, 2 ailerons)
ENGINE: Tower Hobbies .75 2-stroke
FUEL: Wildcat 2&4 Cycle 15% nitro
PROP: 13x6 Master Airscrew

FINAL THOUGHTS

This is a builder's kit. It was not designed for beginners, but if you have building experience, you shouldn't have any problems with it. At a street price of $139.95, it's a good value. A bonus is that every time I walk into my shop and see this short, fat, round airplane, I laugh. It's hard to believe that it was once the world's fastest aircraft.

See the Source Guide on page 137 for manufacturers' contact information.



> "The Nitro Rascal does fly inverted! And it can also gain altitude in that attitude."

BY MARTIN ROBINSON > PHOTOS BY JOHN REID & MARTIN ROBINSON

SIG MFG.

Nitro Rascal

Good things come in small packages!

SIG MFG. HAS AT LAST BROUGHT ITS POPULAR RASCAL ARF kits to the ½A crowd with the release of its Nitro Rascal ARF. It's perfect for novice pilots and anyone who wants to add a small Rascal to his fleet. Gone are the days when little engines screamed wide open until the gas ran out; Norvel has changed all that. The Nitro Rascal is a perfect match for the new powerplants and can be flown at relatively small fields. With its steerable tailwheel, it's also right at home with its larger companions taxiing down the runway at larger flying fields.

SPECIFICATIONS

MODEL: Nitro Rascal ARF
MANUFACTURER: Sig Mfg.
TYPE: ½A sport flyer
WINGSPAN: 49 in.
LENGTH: 32.5 in.
WING AREA: 324 sq. in.
WEIGHT: 22.8 oz.
WING LOADING: 10.1 oz./sq. ft.
ENGINE REQ'D: .061 to .074
RADIO REQ'D: 3-channel, micro-receiver and 3 sub-microservos
PRICE: $109.99

COMMENTS

Sig has once again produced a high-quality RC model, and it is a great addition to the Rascal line.

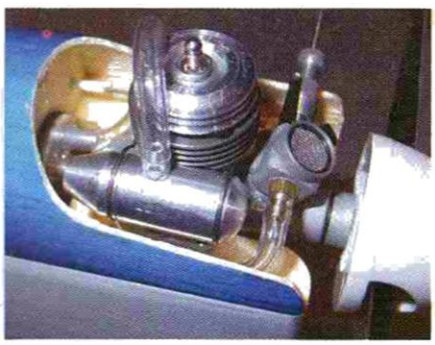
HIGHLIGHTS

- Beautiful two-tone, traditional Rascal covering
- Very complete kit; well-made ARF
- Flies great

THE KIT

Sig always provides the highest-quality kits. Everything is securely packaged, and every step has been taken to help expedite assembly. The Rascal features all-wood construction and comes expertly covered with Oracover. A well-written instruction manual and a very generous hardware package supply most of the necessary components.

The photos in the comprehensive manual were so detailed that I think I could have assembled the model using the pictures alone. There's even a section on selecting radio equipment and engines. You need only basic hobby tools. The manual also includes great building tips.



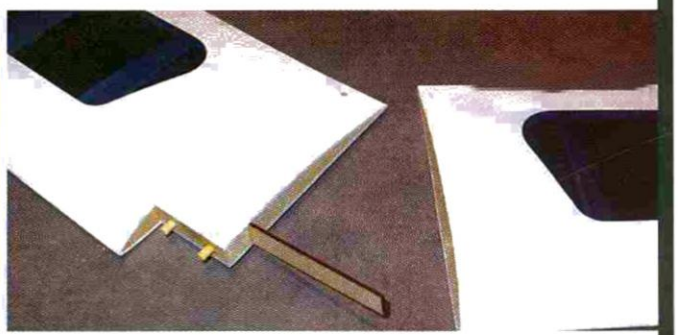
The engine compartment has plenty of room for everything, and the engine is out in the open for easy airflow cooling.

Fuselage The fuselage is made of balsa and light plywood, and the two-tone transparent blue covering is very well done. I like that the covering allows you to see the structure underneath it—especially the aft fuselage. I used three Hitec HS-55 sub-microservos that fit neatly in the factory-installed servo tray. The guide tubes for the three pushrods come installed and line up nicely with the servos. The landing gear slides into a plywood channel, and you simply epoxy it into place. Add the lightweight wheels and wheel pants later. The fuel tank fits perfectly in the nose, and because its front protrudes through the firewall, connecting the fuel lines is an easy task. I installed a Norvel .061 RC engine and then attached the prop and the spinner. Following the instructions, I used ⅛-inch-i.d. fuel tubing to run the exhaust out through the bottom of the plane. To give the exhaust a nice finish, add a short piece of aluminum tube to the end of the tubing.

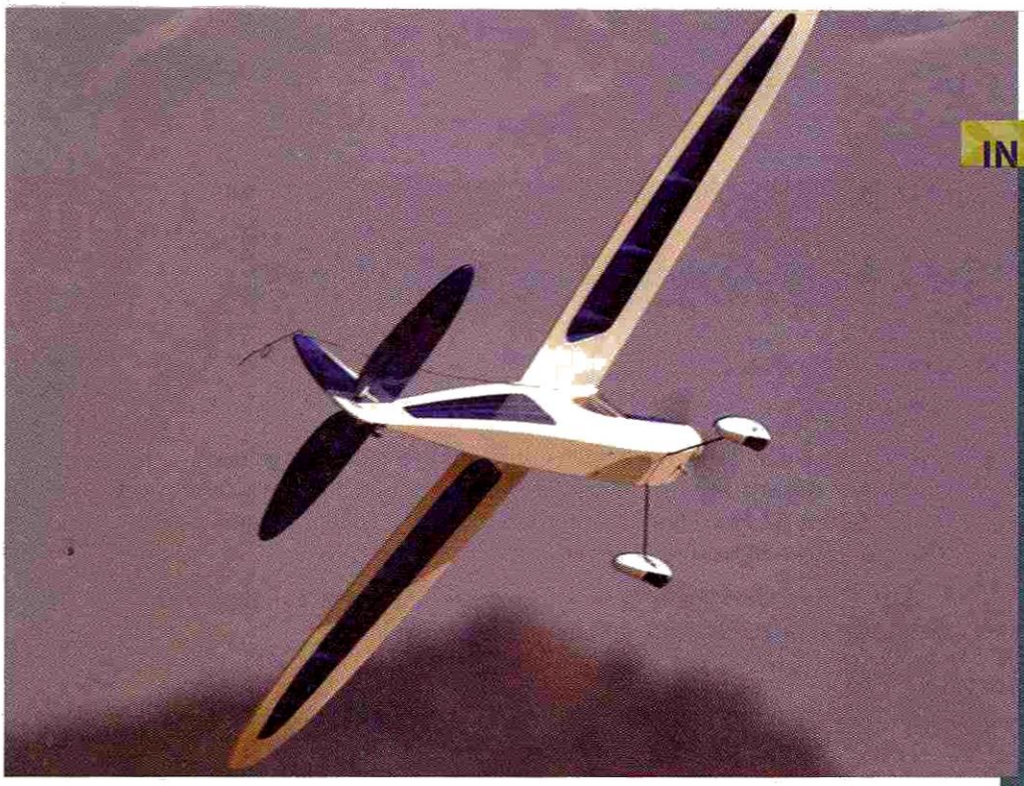
The horizontal stabilizer fit perfectly and lined up well with the wing. I used 5-minute epoxy to glue it and the vertical fin into place. The tail group comes already slotted for CA hinges. Simply insert the hinges, center them between the two surfaces and wick CA between the hinges and the slots. I finished the fuselage by installing the steerable tailwheel.

Wing The model's construction involves a lot of detail work—especially the wing. The wing consists of three major components: two outer sections and a center section. The ribs are all cap-stripped. A plane of this size and quality would have taken a long time to build from scratch. The dihedral brace comes built into the center section, and that makes assembling the wing easy. The two outer sections are simply epoxied to the center section, and after the glue has dried, self-adhesive covering strips conceal the seams. That's it; the wing is finished!

The Hitec HS-55 servos fit perfectly into the servo tray inside the fuselage. The pre-installed pushrods line up well with the servo arms.



The spar is inserted far inside the wing, thereby creating a very solid, one-piece plank. Without ailerons to install, the wing assembly is quick.



GEAR USED

RADIO: Futaba 8U transmitter and Hitec 555 receiver, 3 Hitec HS-55 sub-microservos

ENGINE: Norvel AME .061 RC

FUEL: Wildcat 25% nitro

PROP: Master Airscrew 6x3

Radio gear and final assembly All that's left to do now is to connect the servos to the control horns and the throttle. The manual recommends that you remove the throttle stop screw from the carburetor so you'll be able to kill the engine with "throttle cut." Although Sig recommends a 250mAh receiver pack, I chose to install a Hitec 750mAh ½-AA NiMH receiver pack; wrapped in foam, it fit properly in the nose. I also wrapped the Hitec 555 receiver in foam and secured it with a couple of balsa strips glued just behind the access door in the fuselage belly. The Rascal balances perfectly with the recommended radio equipment.

I followed Norvel's recommended engine break-in method; I ran the engine very rich through three tanks of fuel, which took about half an hour. When the engine has been broken in, lean it out a bit, and you shouldn't have any problem getting 10 minutes of flight per tank. I was amazed by how easily this engine started and how well it ran. The very effective muffler gives it a nice tone. The exhaust extension helps to divert the oily exhaust from the fuselage and looks very cool. I couldn't wait to get to the flying field.

FINAL THOUGHTS

I am very happy with the quality, construction and completeness of the Nitro Rascal ARF. It is a great addition to the Sig lineup, and I'm sure you will enjoy it as much as I do.

See the Source Guide on page 137 for manufacturers' contact information.

IN THE AIR

I used Wildcat 25-percent-nitro fuel for break-in, and I made sure that the engine head never got too hot to touch. I double-checked that the model balanced at the specified CG, and with a fully charged airborne battery pack, I was ready to head to the field for the Rascal's maiden flight.

CONTROL THROWS

Elevator: ±7/8 in. (high); ±3/8 (low); **expo:** -70% (high rates)
Rudder: ±1 in. (high); ±1/2 (low); expo: -70% (high rates)

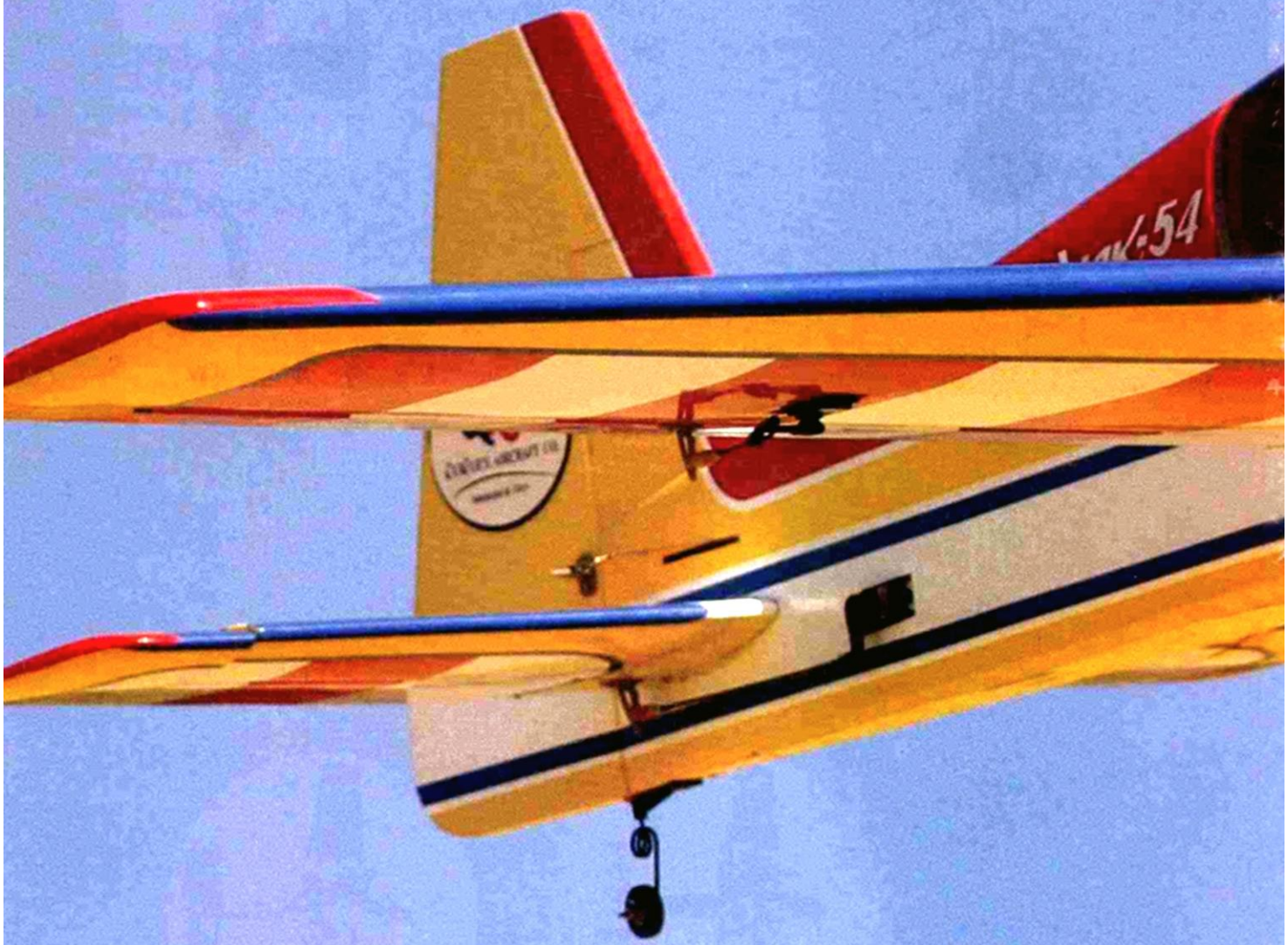
GENERAL FLIGHT CHARACTERISTICS

- **Stability:** the plane is stable enough to take off from the ground or to be hand-launched. The Nitro Rascal levels out nicely after exiting turns.
- **Tracking:** the model tracks very well, but wind gusts affect its flight path.
- **Aerobatics:** barrel rolls, hammerheads, loops and inverted flight—all with just rudder and elevator controls—are possible.
- **Glide performance:** my first flight ended in a deadstick (I forgot to keep track of the time). I had no trouble circling it around to final approach and making a nice runway landing.
- **Stalls:** the Rascal is very docile; it has no negative wingtip-dropping characteristics.

PILOT DEBRIEFING

I was pleasantly surprised by how much rudder authority the model has. I always thought that ailerons were needed for most aerobatic maneuvers. A nearly axial roll quickly changed my opinion. On high rates, just kick full rudder, and when the model is inverted, give it some down-elevator. The Nitro Rascal does fly inverted! And it can also gain altitude in that attitude. Its flight speed is about 30mph. This is fast enough for a scale appearance. It has great ground handling. Ground takeoffs require about 40 feet of smooth surface. If you're on rough ground, you'll have to hand-launch it; a gentle toss is all it takes. I ran 15-percent-nitro fuel, and the engine ran as well as—if not better than—it had on 25-percent nitro. Either way, at full throttle, I had flight times of more than 10 minutes. The Norvel .061 turning a 6x3 prop gives adequate power, but I may switch to a 7x3 prop for a little more pull.

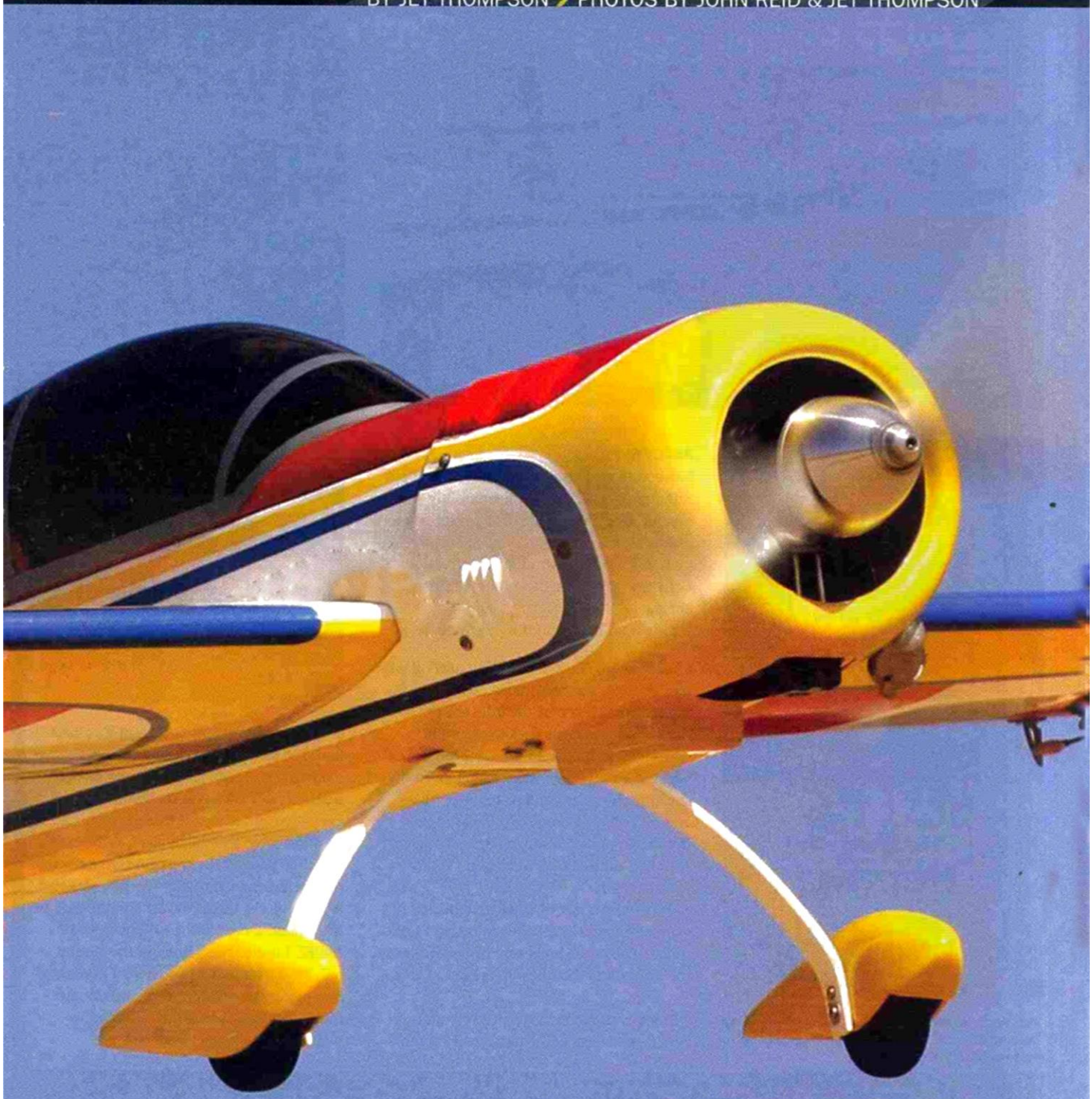
> "... they produced a plane that really does blur the line between hardcore 3D PERFORMANCE AND PRECISION STABILITY."



QUIQUE'S AIRCRAFT CO.

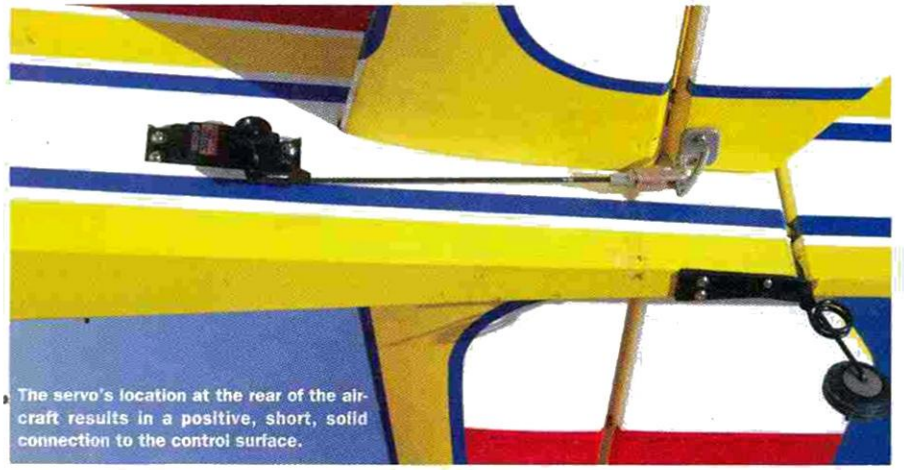
YAK-54

BY JET THOMPSON > PHOTOS BY JOHN REID & JET THOMPSON



An aerobatic hit!

QUIQUE'S AIRCRAFT CO. HIT A home run with its first foray into mass-produced ARFs. Its 72-inch Yak-54 designed by Wayne Ulery and Quique Somenzini is by far the best ARF of its type I have ever flown. By combining design geometry and careful setup, they produced a plane of topnotch quality that really does blur the line between hardcore 3D performance and precision stability.



The servo's location at the rear of the aircraft results in a positive, short, solid connection to the control surface.

SPECIFICATIONS

MODEL: Yak-54
MANUFACTURER: Quique's Aircraft Co.
TYPE: semi-scale aerobatic/3D ARF
WINGSPAN: 72 in.
LENGTH: 70 in.
WING AREA: 1,908 sq. in.
WEIGHT: 11 lb. 2 oz.
WING LOADING: 13.43 oz./sq. ft.
ENGINE REQ'D: 1.2 to 1.8 (2- or 4-stroke)
RADIO REQ'D: 4-channel (rudder, elevator, throttle and ailerons) w/6 servos
PRICE: $399.95

COMMENTS

There's lots of buzz going around these days about the Yak replacing the Extra as the next great all-purpose performer. After just one flight, I was a believer, and it just keeps getting better each time I fly this plane.

HIGHLIGHTS

- Superb 3D and IMAC flyer
- Excellent construction quality
- Great looks

The Yak's fuselage has ample room for all of my radio equipment. I used hook and loop fastener to hold everything in place.

ASSEMBLY

Since this was Quique's Aircraft Co.'s first offering, I expected a few stumbling blocks during assembly. Instead, I found a good assembly manual (a very nice surprise) to precisely guide me through construction. To help the pilot get the plane flight-ready, almost half of its 32 pages are dedicated to setting up the model for flying.

Tail feathers The key to getting the horizontal stabilizer straight is to first center it in the fuselage and then measure from the tips to the front of the turtle deck to ensure that both sides of the stabilizer are the same length. Once the stab was set, I removed the covering where it would meet the fuselage and wicked a few drops of thin CA to hold the stab in place. I rechecked the alignment and then added a fillet of medium CA for extra strength.

When the horizontal stab and fin are set, glue the Robart HingePoints into place. Make sure that all of the hinges are perpendicular to the surface and that the pins are free of glue.

Elevator, rudder and engine The elevator servos are in the rear of the plane, which simplifies the linkage and produces a cleaner installation. The pull-pull rudder servo is installed on mounting rails in the radio compartment and is placed on the fuselage centerline. I used a long servo arm to ensure that the cable geometry at the servo and the rudder was the same.

Before you install the engine, attach it to the engine mounts so that you have 5½ inches between the thrust washer and the back of the mount. Once I had positioned the YS 1.40FZ, I drilled no. 3 holes in the mount rails for the blind nuts and bolted the engine into place. The manufacturer recommends that the engine be mounted inverted to maintain the plane's lateral balance.

IN-COWL MUFFLER

after several flights with the stock YS muffler, I checked out Northern Model Products' new in-cowl muffler designed for the Yak-54; it's exceptionally easy to install. I installed the header, which redirects the exhaust 90 degrees in any direction. In this application, I set the header straight back toward the tail. A silicone exhaust tube on the header is fastened to the muffler canister, which is bolted to the bottom of the engine box and sends the exhaust straight downward through the bottom of the cowl. The muffler is attached with two rubber isolation mounts secured to both ends of the canister.

It takes about 30 minutes to install the new muffler system, and it shaves almost 2 ounces off my Yak. I can detect no increase in noise (it still sounds throaty, like a YS should), but it looks a lot better. One of my buddies has an almost complete kit on his bench, and he's going to power it with a YS 1.40DZ because he wants to preserve the scale look. This system is just the ticket for that!

IN THE AIR

The APC 18x6W prop working in concert with the YS 1.40FZ engine provides all the power that 3D pilots expect from a plane of this caliber. When you combine power to spare with a beautiful blend of maneuverability and stability, the result is a topnotch plane.

CONTROL THROWS

Elevator: ±2 15/16 in. (high); ±1½ in. (low); expo: 80% (high), 55% (low)
Aileron: ±1¾ in. (high); ±1 3/16 in. (low); expo 70% (high), 55% (low)
Rudder: ±2½ in. (high); ±1 11/32 in. (low); expo 45% (high), 15% (low)

GENERAL FLIGHT CHARACTERISTICS

- **Stability:** I really like the way the Yak handles IMAC maneuvers on low rates. The generous exponential really helps here.
- **Tracking:** there's nothing like a well-balanced plane to keep lines straight and true.
- **Aerobatics:** 3D and precision—this plane handles both with aplomb.
- **Glide performance:** low wing loading makes those emergency glides home a little easier.
- **Stalls:** this type of plane is intended to stall predictably, and that's exactly what it does.

PILOT DEBRIEFING

With the balance set exactly where Quique recommends, inverted flight requires just a little pressure to maintain level. Once the plane is properly trimmed, IMAC maneuvers are graceful and clean. Snap-rolls are quick but still stop on a dime using low rates. Level knife-edge passes and point rolls can be done on low-rate rudder. Rolls are axial, and slow rolls can be stretched from horizon to horizon.

The Yak performed every move I know how to do with ease and then begged me to invent new ones. Harriers are locked in, and with 50-percent spoileron mixed in, there was no wing rock. Waterfalls are tight, and it pops into Parachutes with no bad habits at all. When entering a Wall, the Yak moves forward horizontally for a few feet while it is pointed straight up and looks great. The YS 1.40 Sport engine has plenty of power to hover at around ¼ to ⅓ throttle and then accelerate vertically, even when using only 20-percent nitro. Thirty-percent nitro gives it that little extra boost that power junkies (like me) crave.

FINAL ASSEMBLY

The fiberglass cowl is attached to the fuselage with four screws. After a few flights, however, I found that the cowl seemed a bit loose from vibration, causing the screws to enlarge the holes in the cowl. I slipped tiny pieces of silicone fuel tubing over the screws to isolate the cowl from the screws.

The canopy is held in place by a front tab that slides into a slot in the firewall and with two screws at the rear. The cowl also overlaps the front of the canopy by about ¼ inch.

The two-piece wing slides onto an anodized-aluminum wing tube that fits through the fuselage. Each panel has two anti-rotation pins that double as securing points to hold the panels in place during flight. When installing the anti-rotation pins, I carefully measured the distance from the hole that accepts the locking pin to the root of the wing. The manual says 9mm, but the picture shows 8mm. According to Quique, 8mm is the correct measurement.

RADIO AND SETUP

The receiver, switch and throttle servo are all mounted on the tray in the radio compartment. Quique suggests a rather ingenious mounting method: secure a piece of masking tape to the bottom of the receiver, and then glue the receiver to a piece of foam which, in turn, you glue to the tray. This method keeps the receiver securely in place while isolating it from vibration.

The CG is critical to the airplane's flying characteristics. To balance the Yak, all I had to do was mount my relatively large 1500mAh Ni-Cd pack up against the firewall.

I used a YS 1.40 sport engine recommended by Quique, and I found it to be a perfect blend of power and weight. It had excellent throttle response and fuel economy.

FINAL THOUGHTS

I think Quique's Aircraft Co.'s Yak-54 is easily the best all-around flying machine in my hangar. It is as adept at IMAC maneuvers as it is at hardcore 3D stick-banging fun. Should I ever perform a "durability test" (crash), I won't hesitate to replace it with another one. On a vote for best aerobatic ARF of the year, this one is at the top of my list. ✈

See the Source Guide on page 137 for manufacturers' contact information.

GEAR USED

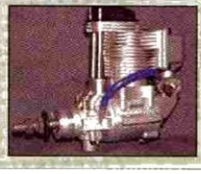
RADIO: JR XP8103

TRANSMITTER: 4 Hitec HS-5625MG servos (ailerons [2], elevator [2]); 1 HS-5925MG servo (rudder); 1 HS-425BB servo (throttle)

ENGINE: YS 1.40FZ

FUEL: Byron 15% Premium Sport 4-Cycle

PROP: APC 18x6W



Install Lighting Systems in Your ARF

SCALE DETAILS THAT REALLY WORK!

BY GERRY YARRISH

WHAT SETS SERIOUS SCALE MODELS apart from sport-scale models? It's all in the details. Today's scale, almost-ready-to-fly (ARF) planes are really quite amazing. They're built light and fly great, and many have excellent scale lines. By adding scale landing lights and other navigational lighting systems from the RAm company, you can take a scale ARF such as the Dave Patrick Models Super Cub and elevate it to the next level! Here's how to do it.

LANDING LIGHTS

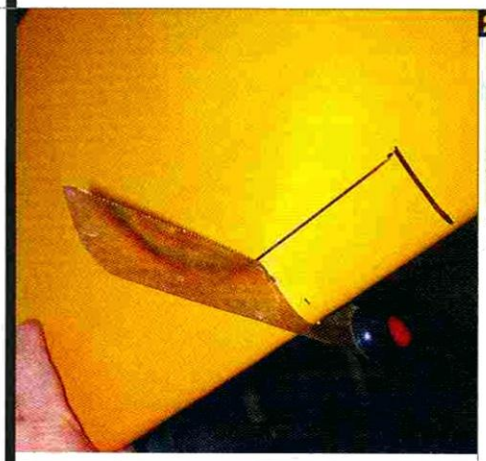
WHAT YOU'LL NEED

To install RAm's lighting systems in your ARF, you'll need the following tools and supplies:

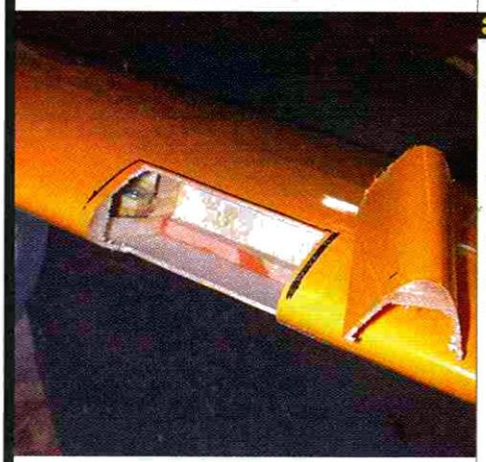
- Fine-tooth razor saw
- Hobby knife (with several new blades)
- CA glue and accelerator (I used Dave Patrick Models Max CA)
- 1/8-inch lite-ply
- 1/16- and 1/32-inch plywood
- 1/16- and 1/8-inch balsa sheet
- A Dremel Moto-Tool with cutoff disc
- A power drill and edge-sharpened brass tubes to use as cutting bits
- 0.010-inch clear plastic sheet
- Covering material to match your model's finish (I used UltraCote)
- Matching stick-on trim sheet
- Miscellaneous small screws

1

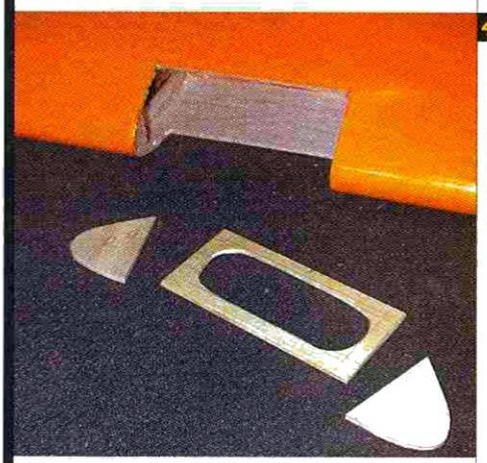
Use scale drawings to determine the locations for your landing lights. With the Super Cub, twin lights are installed in the port wing panel and are protected behind a clear leading-edge cover. Most leading-edge landing lights are positioned between two wing ribs.



2 Use a sharp razor saw to make the vertical cuts square to the leading edge. To retain the wing's strength, be sure to cut only into the open area between the ribs.



3 Use a straightedge and a sharp hobby knife to make the horizontal cuts that complete the wing cutout. Notice the lightening holes that were already cut in the wing ribs. They make it easy to route the lighting-system wires.



4 Cut the frame pieces out of 1/8-inch lite-ply. Use paper templates as a guide for the frame pieces. Cut them out so they'll fit flush to the wing's surfaces.

5 Here, the frame pieces have been glued into the wing's cutout. You can now cover them to match the wing, or you can wait to cover them when all the pieces are ready to be installed.

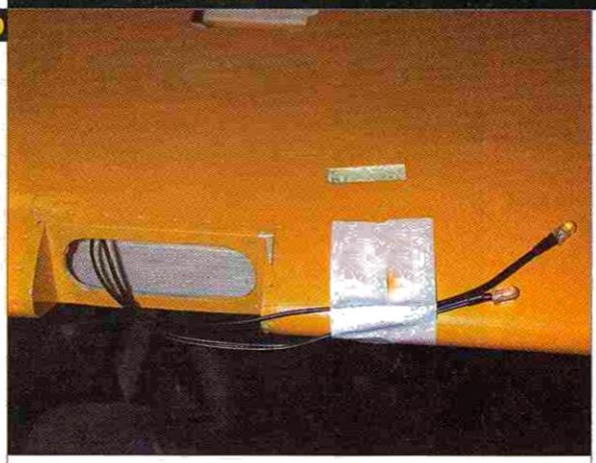
6 Make the reflector support plate by cutting two 3/4-inch holes in a piece of 1/16-inch plywood. The plate should be just large enough to cover the back frame without extending beyond the wing cutout.

7 Here, the support plate and reflectors have been set into place to check the fit. These 1-inch-diameter reflectors have an 1/8-inch lip around the outer edges. The 3/4-inch-diameter holes in the plate allow the reflectors to sit flat against the support plate.

8 To hold the reflectors against the support plate, make a cover plate out of two pieces of 1/32-inch ply. The cover's inner layer has two 1-inch openings that fit around the reflectors. The outer layer has two 3/4-inch openings that fit on top of the reflectors. Glue the layers together so the openings are centered over each other.

9 Use small Phillips-head screws in the corners to secure the support plate to the back frame. Then screw the cover plate to the support plate.

LANDING LIGHTS



10 Working from the root end of the wing panel, feed the two landing-light wire leads through the wing and pull them through the cutout. Here, the frame pieces have already been covered with UltraCote and the leads temporarily taped to the leading edge.

11 Cut a piece of clear 0.010-inch plastic sheeting to fit around the cutout, and apply stick-on trim sheet around its edges to form the outer-cover frame. Tape it into place. To form it around the wing's leading edge, lightly heat the plastic with a hair dryer. This relieves stress in the plastic and reduces the chance that it will crack later.

12 Mark the screw positions on the tape, and use a thumbtack to pierce holes around the outer frame through the plastic and into the wood. Install all the screws, and reheat the plastic covering so its edges lay flat against the wing. Now, remove all the screws and take everything apart so you can paint the cover and support plates flat black.

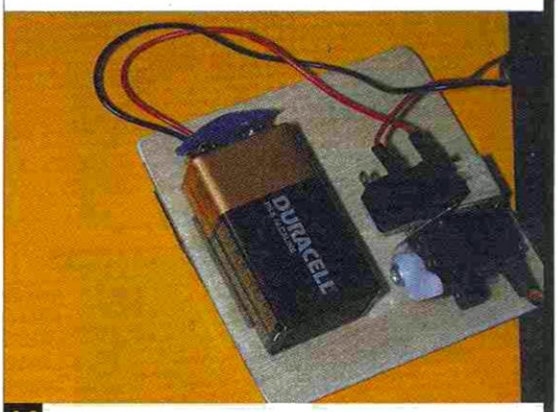
13 Here's the completed landing-light assembly. The LEDs have been tack-glued into the back of the reflectors with a drop of medium CA.

DIME-STORE REFLECTORS

To really make your landing lights shine and look scale, you'll need to supply a reflector receptacle for each of the LEDs. The perfect place to look for anything is at a discount or odd-lot store. In this case, pick up a couple of cheapo key-chain flashlights—you know, the little cheesy ones that use an AA battery and light up for about 10 minutes. They'll do nicely. For ¼-scale models, look for the flashlights that have 1-inch-diameter lenses. Unscrew the front bezel that holds the

lens and the reflector in place and pop out the reflectors; throw the rest of the junk away.

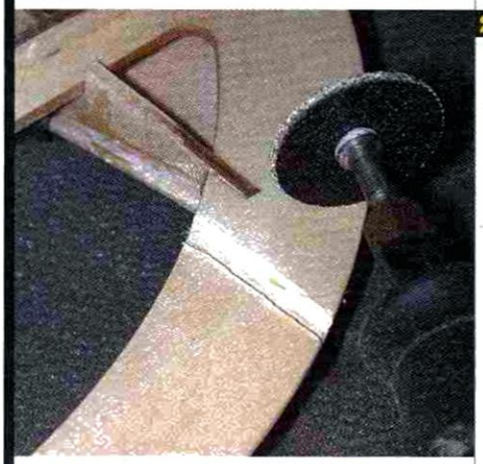
"If anything can go wrong, it will!" That's Murphy's Law, and it is ever present in RC modeling. With this in mind, you should always install your lighting systems so they can be easily replaced should a bulb fail. If you use glue, use it sparingly. Use small screws to hold the lens and reflectors in place.



14 The landing lights' power switch, battery and activation servo are attached to a plywood plate that fits into the opening in the root rib. The plate is secured with Velcro®, so it's easy to remove it for maintenance and battery changes.

That's it for the landing lights. Simply plug the servo into an auxiliary radio channel or use a Y-harness to connect it to the flap servo, and you'll be good to go! Next up: navigation lights.

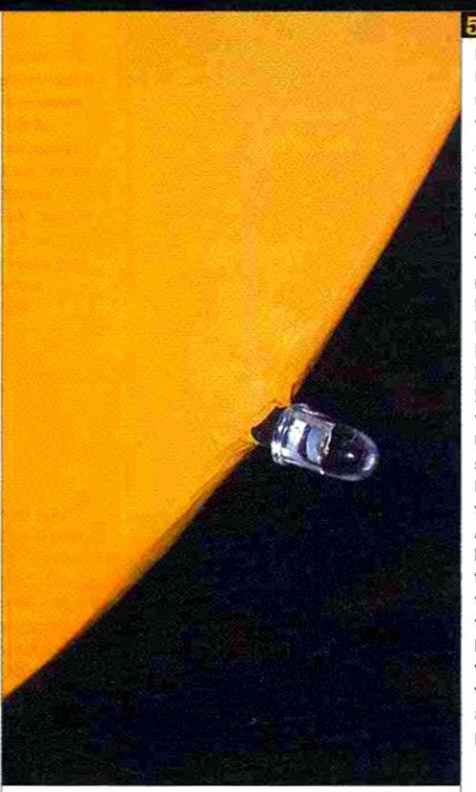
1 Remove the covering from the wingtip. This exposes the tip's structure so you can add support to the area beneath the navigation light. Run the wingtip-light wire from the root rib, through the openings in the ribs and out to the wingtip.



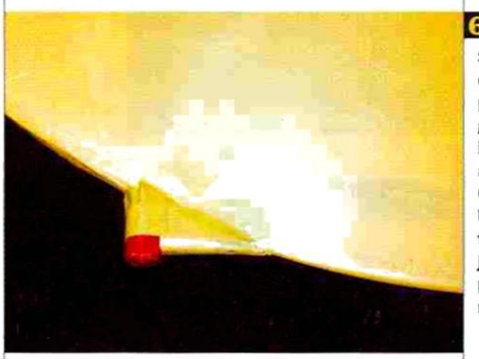
2 Determine the position of your wingtip light, and use a Dremel tool fitted with a cutoff disc to make a channel for the wire; cut only halfway through the wingtip bow.

3 Set the wire into the channel, and glue scrap balsa over the channel to hold the wire in place. Glue a second piece of balsa under the wingtip bow. Do not glue the wire into place yet.

4 To make it easier to re-cover the wingtip area and to add some strength, sheet the area between the leading edge and the main spar with 1/16-inch balsa. Cut the sheeting flush with the wingtip bow, and then sand the sheeting and the scrap-balsa support pieces smooth before covering.



5 Use four pieces of UltraCote to re-cover the upper and lower surfaces of the wingtip (two pieces on each side). Start with the bottom of the wingtip and cover the area from the trailing edge forward to the back edge of the new leading-edge sheeting. Overlap the covering ½ inch onto the balsa. Pull out the wrinkles and then cover the leading-edge sheeting with a second piece of UltraCote. Do not heat-shrink the covering yet. Now, do the same for the top of the tip area. After all of the edges have been sealed down tightly, heat-shrink the tip's covering until it's tight. After the covering has been tightened, pull the wire lead to draw the LED into position and tack-glue it into place with a drop of CA.



6 Slip the colored bezel over the LED, and complete the assembly by gluing a wedge of 1/8-inch balsa to the wingtip and behind the light. Cover the balsa with UltraCote, and add some trim sheet to finish the job. Here, the completed port navigation light is ready for action.

7 Follow the same steps to install the starboard wing panel, and you'll be finished with the wings.

Your nav lights are now good to go! On to the rudder lights.

LIGHTING THE WAY!

Prewired lighting systems are available from RAm. Each is powered by a 9V transistor battery, and the systems used in this article are:

LANDING LIGHTS (RAM 123)
Mounted inside the leading edge of the port (left) wing panel.

NON-FLASHING NAVIGATION LIGHTS (RAM ULTRA LITE 125)
Mounted on each wingtip: red, port (left); green, starboard (right); and white, the trailing edge of the rudder.

MARS ROTATING BEACON (RAM 04)
Mounted on top of the rudder, this marker light brightens and dims to simulate the full-size aircraft light that rotates like a lighthouse beam inside its bezel light. The "rotation"-cycle speed is adjustable.

All the "bulbs" in these lighting systems (with the exception of the Mars rotating beacon) are high-intensity, light-emitting diodes (LEDs). LEDs are far less susceptible to vibration damage and provide very long service life! RAm has several other popular lighting systems, but these are the most popular for scale model airplanes.

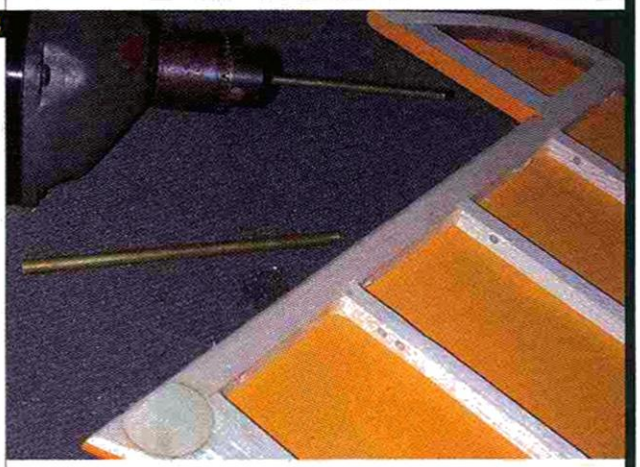
RAm lighting systems such as the Landing Light Set make the job easier. The microswitch comes prewired into the system.

The Mars Rotating Beacon Light System comes with a controller board so you can adjust the speed of the light flashes.

RUDDER LIGHTS

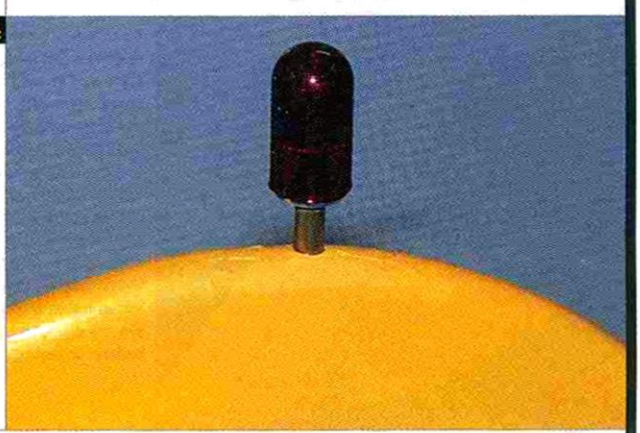
1 With a sharp hobby-knife blade, remove one side of the rudder covering and clean away any leftover material from around the edges. Be sure to remove the covering that overlaps the other side.

2 Use a power drill and a sharpened 3/16-inch brass tube to cut the holes in the top and trailing edges of the rudder and in the internal ribs. Then cut a 1/4-inch hole in the leading edge just above the rudder's bottom-hinge slot.

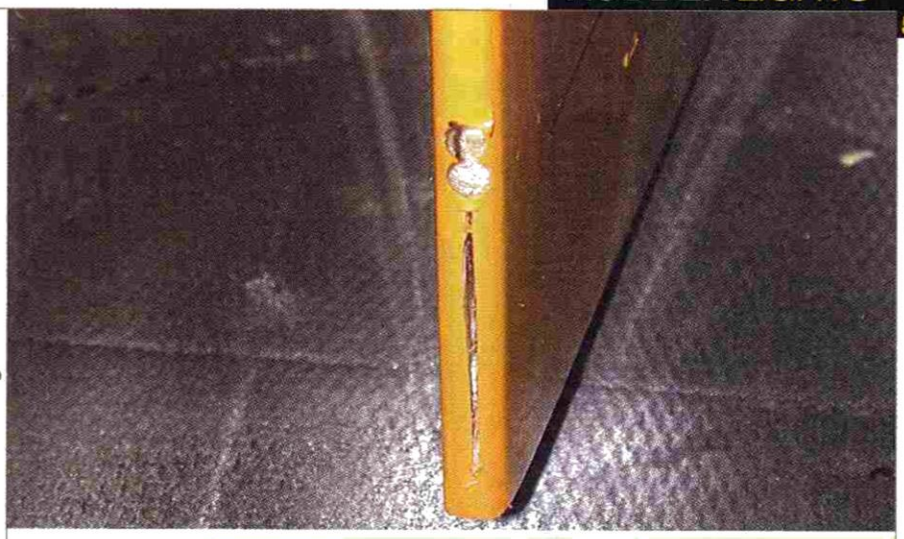


3 Pull the wires through the holes and out through the leading-edge hole. The white navigation light should be placed in the trailing edge and the Mars beacon light at the top of the rudder. Tack-glue the wires into place so they don't touch the outer covering. Re-cover the side of the rudder with UltraCote.

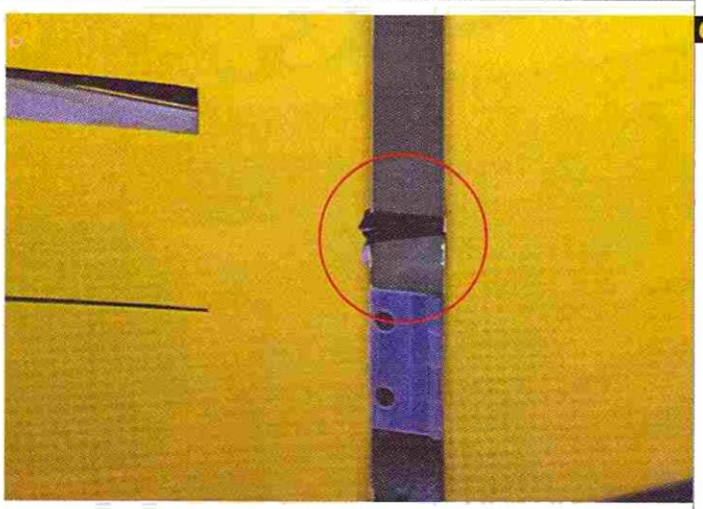
4 The Mars rotating-beacon assembly is made out of a 1-inch-long piece of 3/16-inch brass tube that has a washer glued on it to form the bezel base. Glue the tube into the hole, and then glue the bezel to the washer with medium CA.



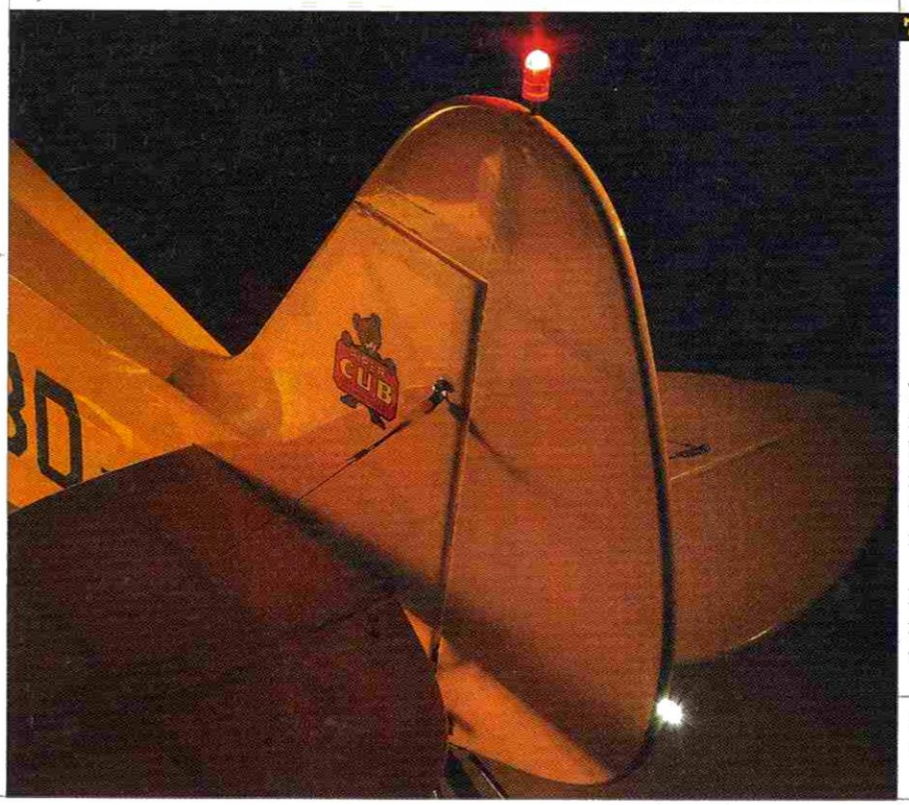
RUDDER LIGHTS



5 Cut a slot all the way through the rudder tail post with a sharpened ¼-inch-diameter brass tube. To maintain the integrity of the wood, make sure that the slot is centered in the tail post.



6 Slip the rudder-light wires through the tail-post slot, and then hinge the rudder into place. Do not glue the wires into the slot; they should slide freely as the rudder moves from side to side.



7 Preparing for departure, the Super Cub is ready for a night flight.

That's it! All that is left for you to do is install the batteries, switches and control boards in a convenient place within the fuselage. Wrap them with foam and secure the hardware with Velcro® so it doesn't move around.

Light up your model's life with RAm lighting systems. They add greatly to your model's realism and are just "plane" fun to use. Enjoy them!

See the Source Guide on page 137 for manufacturers' contact information.

BY PAT TRITLE > PHOTOS BY PAT TRITLE

Ingram Foster

Biplane

A pioneering pusher design for electrics

I HAVE ALWAYS THOUGHT that the Ingram Foster pusher biplane would make an excellent model. Builders will notice that I've used several out-of-the-ordinary materials. All the components are easily obtained, and you'll find most of the hardware at hobby shops, online, or in mail-order catalogs. In spite of its unusual nature, this biplane is really a lot easier to build than you might think.

BUILDING THE MODEL

The fuselage Begin with the fuselage; cut the upper and lower carbon-fiber tail-boom tubes to length. Mark and drill the holes for the vertical bracing and the retention pins. I used bamboo skewers for the uprights and CA'd them into place. Before you glue the assemblies together, sand an angle at the rear for the horizontal stabilizer, and paint the booms a light tan "bamboo" color. Then, to represent scale metal clamps, wrap strips of aluminum duct tape around the booms as shown on the plans. Reassemble the booms over the plans and glue them together. Mark the booms for proper orientation during final assembly.

Build the forward fuselage frame with basswood. Stack, cut and drill the upper longerons for the bamboo cross-bracing, and glue them together over the plans. Build the bamboo V-braces, and glue the rest of the fuselage assembly together.

Make the brass nosewheel brackets, and then drill the holes for the toothpick pins that will hold them to the frame. Once you've drilled the brackets, roughen them with sandpaper, glue them to the frame, and drill the toothpick-pin holes. Secure the pins with a drop of thin CA on both ends. Finish the job by wrapping two layers of aluminum tape around all the attachment points.

To complete the basic fuselage assembly, apply three coats of varnish to the frame, and brush all the uprights, metal bands, brackets and braces with Testors Model Master Steel Metalizer paint.

I made the dummy engine and radiator details out of bits and pieces I had in my workshop.

Flying surfaces Build the rudder and horizontal stabilizer over the plans, and then sand the edges round. Hinge the elevators using thin strips of CA hinge material. Build both wing assemblies over the same wing view on the plans. The upper and lower wings are slightly different, so study the plans carefully.

Remove the wing from the plans, add all the gussets and blocks, and then sand the wing to its final shape. Repeat the process for the next wing, and then mark and drill the holes for the motor-mount struts.Build the two ailerons, and sand their edges round. Use the aileron side view to build the actuator frames using toothpicks and brass deadeyes from Model Expo, but don't glue them into place yet.

The seat and landing gear. The seat moves with aileron input; make sure that its framework moves without binding. I made the seat cushion out of an old leather wallet.

The main landing gear is built using lengths of aluminum tube and dowel. Cut all the lower fitting tubes to length, squeeze the ends flat, drill the wire axle holes and bend the tubes to the appropriate angles. The upper main gear frames are also made of aluminum tube and are drilled for the attachment pins that will secure them to the wing. Cut the dowels to length, and assemble the wheel brackets, but don't glue anything until final assembly.

The model was built to use these beautiful, handmade spoked wheels, which were given to me for the project.

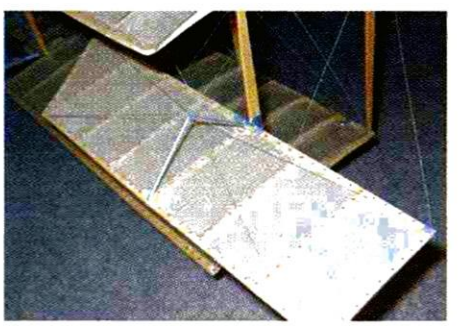
The nosewheel is fixed, and it must be carefully aligned and installed so that the model will track straight ahead during takeoff.

Scale extras such as the control yoke and the articulated seat that moves with aileron action bring the Ingram Foster pusher bipe to life.

Covering I used silk, but iron-on finishes such as Nelson Litefilm, Black Barron Coverlite and Litespan will also do nicely. The structures are too delicate for MonoKote or any of the other thicker Mylar films. Once you have covered the flying surfaces, add the aluminum-duct-tape "brackets" and forward "tip caps" to the horizontal stabilizer, and then add the "hinge brackets" around the aileron hinge notches on the IS-3 struts.

Final assembly To join the upper and lower wings, place the top wing on its leading edge (trailing edge pointing upward), and use a square or a triangle to ensure that its lower surface is perpendicular to the building board. Shim the IS-1 struts ⅛ inch above the building board, and glue them to the top wing with medium CA or 5-minute epoxy. To ensure a good glue bond, trim the covering away from the wooden structures. Place the bottom wing against the struts and position it in the same fashion. When you're happy with the alignment, glue the wing to the struts. Glue all the struts into place to complete the basic assembly.

Place ⅛ -inch shims under the main spar, and pin the lower wing to the building board. Cut the motor-mount beams to length, and drill them for the bamboo vertical mount struts. Slip them into the holes you drilled in the wing and secure them with thin CA. Adjust their height at the rear strut, and secure them with thin CA. Use a small level to set the beams to zero degrees, and secure the front ends to the struts. Add the side and rear diagonal bracing (bamboo skewers).



Controlled by pull-pull cables, the ailerons are attached between the two wing panels.

Rig the wings with 40-pound-test Kevlar fishing line (I use Spider Line). Start at the top front motor-mount strut, and zigzag the line from top to bottom and front to back until you end up where you started. Then repeat the process until all the front, back and side strut bays are rigged in an "X" fashion. Rig the rear motor-mount struts to the innermost struts in the same way. Secure the line only at the ends until all the rigging is in place; then apply a drop of medium CA at each attachment point. The control-surface rigging uses one continuous piece of thread.

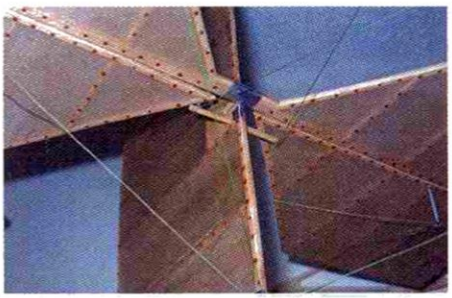
Remove the wing assembly from the building board, and glue the forward fuselage assembly to the wings. Use shim blocks to hold the lower longeron in alignment with the bottom wing. Glue the main gear frames to the lower wing, drill and pin the frames, and add all the vertical and diagonal dowel braces. Use the wire axle pins as a reference for proper frame alignment, and glue the aluminum tubes onto the dowel struts with thin CA. When all the struts are in place, remove the shim blocks.

Bend music wire to make the tail-boom attachment pins, and drill the pin receiver blocks using a tail-boom assembly for alignment. Fit the booms to the wing assembly, and bend the pins as required to fine-tune their alignment. Nick the wire pins in several places to ensure a good bond, and glue them into place with 15-minute epoxy. Align the horizontal stab between the boom's aft ends and glue it into place. Before you glue the forward attachment points to the uprights, block the model up so that the wing incidence is ¾ degree positive, set the stab to zero degrees, and glue the forward points into place. Glue in the seat assembly to complete the basic airframe.

SPECIFICATIONS

INGRAM FOSTER BIPLANE

TYPE: electric pusher
WINGSPAN: 43¾ in.
LENGTH: 43⅛ in.
WEIGHT: 25 oz.
WING AREA: 621 sq. in.
WING LOADING: 5.85 oz./sq. ft.
RADIO REQ'D: 4-channel (rudder, aileron, throttle, elevator)
MOTOR USED: Graupner Speed 400 (6V) with 4:1 gearbox
PROP USED: APC 11x7 E
BATTERY USED: 8-cell, 800 to 1300mAh NiMH



The elevator and rudder use pull-pull cable control. Notice the scale-looking control horns and rigging wires.

The rudder servo is in the middle of the trailing edge and just below the dummy engine. Goop and a balsa-block shim hold it in place.

Install the radio I used 2 Cirrus CS-10 and 2 Hitec HS-55 servos on the prototype. Cut the balsa servo-attachment blocks, and glue them to the lower wing. Cut off the servo-mounting tabs, and glue the rudder and aileron servos into place with household Goop.

Make the aileron and rudder hinges out of 1/32-inch music wire and 1/16-inch-o.d. aluminum tube. Slot the control surfaces' leading edges, and glue the hingepins into place. Glue the actuator frames to the ailerons. Drill holes in the rudder and elevators, and glue the toothpick control horns into place. Glue the elevator hinges into place using white canopy glue such as Pacer 560. Last, glue the rudder and ailerons into place, being careful not to get glue in the hinge tubes.

With the tail booms attached to the fuselage, add the upper and lower rudder stays. Add the tail-boom rigging before you run the rudder and elevator control cables. Rig the cables carefully to ensure that there isn't any interference between the control cables and the tail rigging. The "up" elevator cables pass through the stabilizer covering; mark the holes' positions carefully so that the cables will run nice and straight. The left elevator cables must crisscross so that both elevator halves move in the same direction. Secure the Proctor no. 321 pulleys to the lower booms with a wrap of Kevlar thread and run the rudder cables from the servo arm and through the pulleys, and crisscross them back to the horns.

Secure the aileron pulleys to the wing's leading edges with straight pins. Block the model up on the workbench, and use an incidence meter to set the wing incidence to zero. Then use a small level to set the ailerons to zero. Clamp balsa sticks to the struts to hold each aileron in place while you run the cables. Run the upper cable from one aileron actuator frame, through the pulleys and servo arm and over to the other actuator frame, and loosely tie it off. Run the lower cable from the actuator frame through the pulleys and seat frame and over to the other frame in the same way. When everything is set up properly, tie off the cables and secure the knots with drops of CA.

Attach the motor and gear drive to the motor-mount beams. Set up the Graupner 6V Speed 400 motor with a 20A ESC. Run the motor and aileron leads along the motor-mount strut, and secure them with small zip-ties. Secure the ESC and receiver to the bottom of the wing. I cut and soldered the elevator servo leads into the necessary "Y" configuration. Connect all the servos, and center the controls. Test-run the motor to ensure that it rotates in the proper direction, and then set up all the control throws.

Attach the wheels and secure the axle wires with epoxy at both ends. Build the control yoke and any other details you want to add. If you don't want to build your own dummy engine and spoked wheels, a detailed scale engine kit and spoked wheels are available from Parkflyer Plastics. To allow airflow through the radiators in flight, I used bridal-veil material for the radiator screens.

Final detail painting is simple: the engine and fuel tank are silver; the seat frame is black; all the engine and landing-gear "tubes" are Steel Metalizer; the struts and engine beams are varnished wood; and the radiators are brass. A CD containing more than 50 detail shots of the model is available from Pat's Custom Models.

Before you fly, set the CG point. Don't let the aft CG bother you because the under-cambered airfoil is very tolerant; if the CG is too far forward, the model will be very heavy on the controls and will require lots of power to fly.

COMMENTS

Designed by Pat Tritle, the Ingram Foster pusher biplane is an electric-powered scale model of an early aerobatic version of the original Curtiss Pusher biplane. The model uses ordinary items such as toothpicks and bamboo skewers, and the tail booms are made of carbon-fiber tubes.

FLYING THE PUSHER

Ground handling is excellent: point the model into the wind and ease the throttle to full. Use the rudder as necessary, and add a touch of up-elevator to lift off. Keep the climb shallow, and lead with the rudder, adding a touch of aileron to start banking turns. Keep your turns fairly shallow until you have a feel for the model.

The first time I flew the prototype, it was nose-heavy. In two circuits, I knew this was a rudder airplane. It's really very stable and responsive, but it likes to drift around rather than follow a true flight path. Don't worry; the full-size Curtiss pusher acted in the same way.

To land, reduce power slightly and keep the nose down. The model slows quickly, so reduce power gradually. The model has a very narrow speed envelope, so there isn't a big difference between takeoff, cruising and landing speeds. Simply fly the model down to the runway, ease the nose up a bit, and control its descent with power.

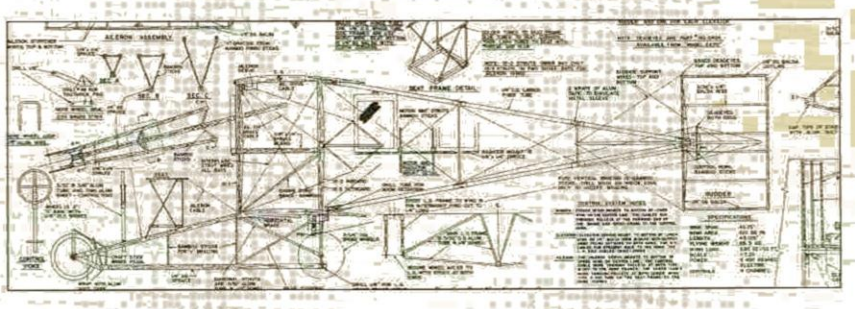
That's all there is to it. The model is definitely out of the mainstream, but it's truly fun to fly.

See the Source Guide on page 137 for manufacturers' contact information.

click trip MODELAIRPLANENEWS.COM FOR MORE PHOTOS AND DETAILING INFO

INGRAM FOSTER PUSHER BIPLANE

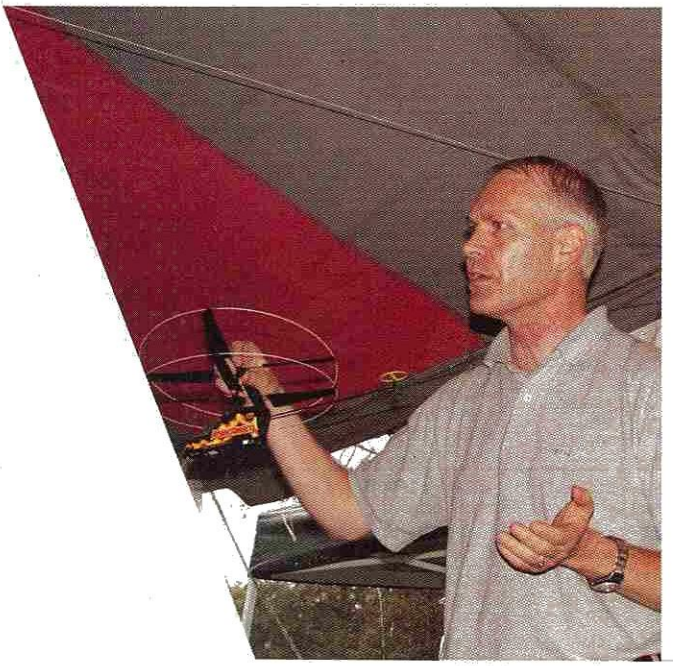
TO ORDER THE FULL-SIZE PLAN, TURN TO PAGE 148, OR VISIT RCSTORE.COM ONLINE.



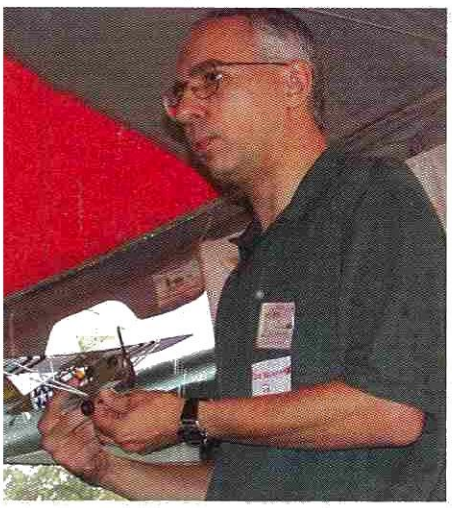
BY MATT KEENNON

NEAT FAIR 2004

Held last September in the Catskill Mountains of New York, the 2004 NEAT Fair was anything but "neat"; it featured record-setting bad weather, including 24 hours of continuous rain that produced flash floods. Nevertheless, a lot of us had a good time!



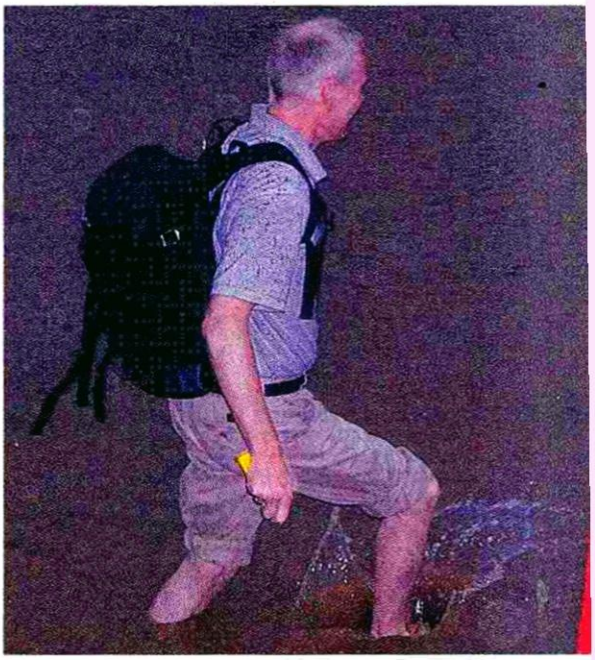
Clockwise from left: Petter Muren and one of his amazing micro helicopters—the BladeRunner, now available at toy and chain stores. >Jean-Marie Piednoir's very cool micro RC models. The "birds" are 1:1 scale martins. >Petter demos his super micro NanoFlyer at the Roscoe Diner. >Joe Malinchak shares his expertise on a variety of micro RC topics.

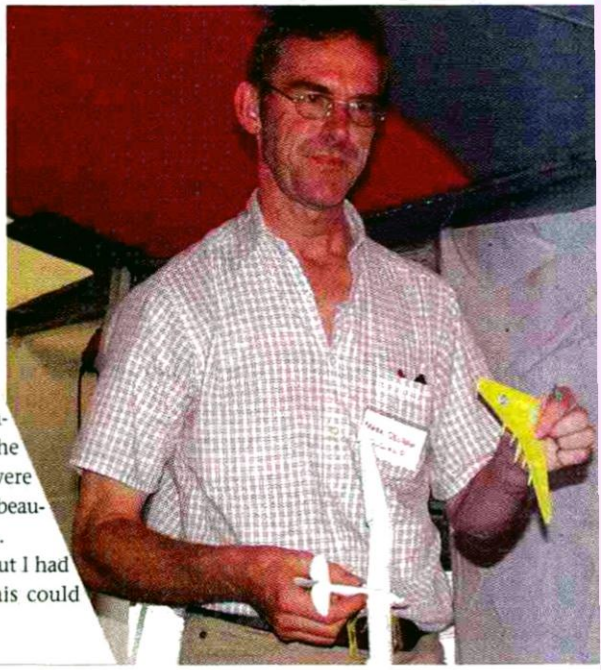


The site of the Northeast Electric Aircraft Technology (NEAT) Fair is a beautiful meadow nestled between two lush, green mountainsides with a river running along one side. It was already raining when we arrived, but it rained last year, and it wasn't a problem, so no one was too worried. Mistake!

I visited some of the vendors and met up with NEAT organizers Tom Hunt, John Worth, Bob Selman, Gary Jones, Fred Marks and Jean- Marie Piednoir of JMP, who came all the way from France. Meeting old friends and making new ones is what such events are all about—especially in the micro-aircraft world because it's such a niche group of passionate participants. In his booth, Bob Selman had a bunch of cool models, including two new ARF stick-and-tissue scale models from Gasparin. He also showed several of JMP's fine micro flying wings, including some decorated as birds.

Clockwise from top left: the empennage of Nick Leichty's mighty micro next to a Euro coin (about the size of a U.S. quarter). >My 2.5g SE5 and Petter's 2.7g NanoFlyer next to a U.S. penny. >Petter wades in the water. >Mark Denham, who runs the Aeronutz website and indoor meets in the UK, shows off a few scale gliders. Mark's presentations are always informative and great fun.





PHOTOS BY MATT KEENNON, RICK RUIJSINK & JEAN-MARIE PIEDNOIR

Flying for our supper

There was very little outdoor flying on Friday, so we all just waited for the seminars to begin. These are hosted by the Bergen County Silent Flyers and are organized by Sergio Zigras, the club's president. He gave a very nice overview of microflight and indoor flight, why the seminars were introduced and what they were designed to accomplish. Basically, the seminars involve much sharing of knowledge.

On Saturday, many of us packed up, left our flooded motel, drove to the Roscoe Diner and tried to figure out how to get to the NEAT site. We stayed there eight hours! We held seminars in the back of the diner, and Petter Muren and I flew our planes a bit to help kill the boredom. The rain subsided late in the day, so we headed out and attempted to reach the indoor event at Walton. We were told that the roads to Walton were flooded, though, so we started the two-hour drive to Downsville High School on the off-chance that the indoor event had been moved there. When we arrived, it was dark and our hopes were fading, but who did we see in the high school parking lot charging a model?—Fred Marks of FMA Direct! But why were fire trucks and ambulances with flashing lights outside an indoor model meet? Well, the Red Cross had established an evacuation center at the school, and Fred was there with the other modelers and locals who had been forced to leave their homes, motels and campsites because of the flooding. The Red Cross offered food, drink and shelter, and we were surely grateful for that.

Making the best of it

We were a small group with models in hand, so we grabbed some food and set off to the gym for indoor flying. We flew until 2 a.m. doing aero-tows, streamer combat with airplanes and helicopters and lots of follow-the-leader. It was fun because it was so casual; we weren't in any rush to leave, and there weren't any frequency-control pins—and no rules! It felt like a strange, surreal type of micromodeling sleepover. The free ice cream didn't hurt, either! We flew and talked about micro-planes till the early morning, since we knew there was little chance of a decent night's sleep on the folding cots in the big gym.

On Sunday morning, we made it back to the NEAT site to survey the damage and pick up the belongings we had left in our tents. Surprisingly, the campsite didn't look too bad, but along the road, trailers and RVs were wrapped around trees, having been carried there by floodwater. It was a beautiful day, but the campsite's operators kept the place closed for clean-up.

If nothing else, it was a NEAT Fair to remember! It wasn't perfect, but I had a great time, and I plan to return in 2005. You don't think this could happen two years in a row, do you?

Dave Platt Models

"Advanced Building Techniques"—the latest from the Black Art Series

Dave Platt has more than 50 years' experience in designing and building scale model airplanes, and he established the gold standard for competition models. Because of the continuing demand for his scale knowledge, Dave has produced a set of videotapes called the "Black Art Series" in which he invites you into his workshop. The series includes titles such as "Building and Fiberglassing Techniques," "Detailing and Painting Techniques," "Scratch This," "The Jet Set" and his most recent four-tape collection, "Advanced Building Techniques."

Advancing the art

Dave takes viewers on a fascinating journey as he creates his new Vought OS2U Kingfisher. Volume 1 covers 3-view drawings and demonstrates that—when it comes to accuracy—all 3-views are not created equal. He begins his project with the main float and shows lofting techniques for bulkhead development. Other sections include an explanation of "room-temperature vulcanizing" (RTV) molds, which are used to reproduce many identical parts, and a discussion about 9-ounce, unidirectional E-glass fiberglass cloth. Construction highlights include the wing, wing fittings and hinges, flap and aileron coves and fuel tanks built into the wing.

In Volume 2, Dave shows flap- and aileron-linkage disconnects and scale control-horn and pushrod installations. Dave talks about G-10 fiberglass material, which he uses to make hinges and overhanging wing skins. He builds an aileron, sheets the wing and finishes up with highlights of the float and float-rudder details, the beaching dolly and molding its wheel hubs.

The most impressive part of the Kingfisher is Dave's hollow-fuselage-construction technique. In a nutshell, he splits the fuselage and builds it in halves over formers. He strip planks the halves with balsa, applies E-glass and resin and then sheets the half shells again. The halves are lifted off the bench so he can bash out most of the formers. Once glued together, the completed fuselage provides Dave with a single, very large, unrestricted space so he can fully detail the model's interior.

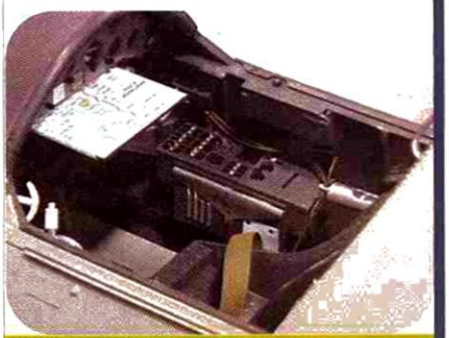
Volume 3 shows the fuselage construction in detail, and that includes the rudder- and elevator-servo installations. Dave also explains his unique method of wing attachment. He uses a piece of string to align elevator hinges, makes the elevators removable, constructs fiberglass cowls and makes gill flaps. Dave also shows how he molds fiberglass canopy frames over MonoKote-covered forming blocks.

A treasure trove of techniques, Volume 4 shows how Dave detailed all the canopy parts, replicated fabric-covered control-surface details and made his impressive dummy radial engine. He makes navigation lights and shows how weathering enhances the model's appearance. Dave adds all of the interior details, including the instrument panel, pilot seat, sidewalls, upper deck equipment, the rear gunner's compartment (with its machine gun and gun ring), radio equipment and so much more. Your imagination will soar when you see his results!

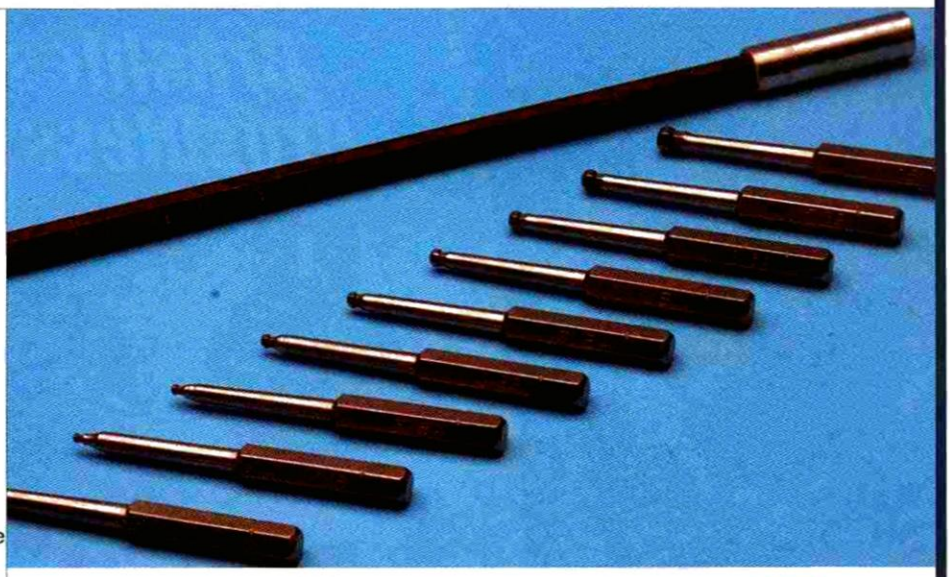
Each video lasts about 2 hours, and all the volumes are available in VHS and DVD format. The first video you buy costs $34.95, and each additional video costs $30.

"Advanced Building Techniques" is a great addition to the already impressive "Black Art" collection. It's highly recommended and well worth your attention. —*Gerry Yarrish*

Dave Platt Models Inc. (321) 724-2144; daveplattmodels.com.



Above: details from the videos.



J&R Hobby Hardware
Ball-Hex Bit Set
Easy access, more torque

I'm always on the lookout for versatile, compact, durable tools that I can assemble in the perfect flying-field toolbox. J&R Hobby Hardware now manufactures a new product that takes care of my hex driver needs. Its new 2½-inch-long ball-hex bits are perfect for anyone who uses hex screws in a variety of sizes. These high-quality ball-hex bits can be used with manual and cordless hex drivers and are available in metric and standard sizes. I can fit a complete set of ball-hex bits in a small compartment in my parts tray.

The advantage of using a ball-hex bit instead of a hex wrench is that you can attach a ratchet screwdriver or handle, a battery-powered electric screwdriver, or a cordless electric drill to rapidly install or remove a hex screw or bolt. The ball head allows the bit to drive the bolt in with high-torque power, even when the bit is inserted into the hex screw or bolt at an angle. The 2½-inch-long hex bits allow you to work in tight quarters without damaging the area with the drill's chuck. If you need a longer reach, J&R Hobby Hardware offers 6- and 12-inch magnetic extensions that cost $2.50 and $6.50, respectively. They will allow you to reach way into the fuselage or wing cavity to reach any hex bolt or screw. If a screw falls into the cavity, use the extension rod to retrieve it!

The standard set includes nine popular bit sizes (½, 1/16, 5/64, 3/32, 7/64, ⅛, 9/64, 5/32 and 3/16-inch) and costs $20. The metric set comes with seven bits that range from 1.5 to 5mm; it costs $15. Pick up a set for yourself and make assembly and disassembly at the field a breeze.

—John Reid

J&R Hobby Hardware
(866) 206-1955; jrhobbyhardware.com.

West Mountain Radio
PWR Crimp
Low-cost crimping tool

Tired of soldering? This 10-inch-long crimper tool was specifically designed to help you attach wires to silver-plated connector pins without solder. It costs only $49.95, and it's designed to accept 15, 30 and 45A APP connector pins. We typically use the 30A variety, but it's nice to have a product that handles all three types of pins.

It's very easy to use. Before you insert the wire into the APP connector pin, remove ¼ to ⅜ inch of insulation from the end of the wire with a wire stripper. Place the APP pin in the corresponding hole on the crimper (15, 30, or 45). The cup or open end of the pin should face outward. Insert the end of the wire into the pin's hole, and then squeeze the crimper's handles to close it. This compresses the pin around the bare wire to make a perfect, strong joint. Last, insert the pin that has the wire trailing from it into the APP plastic housing. Use a small screwdriver to push the pin into the housing until you hear the click that indicates that the pin is locked in it.

I have also found it helpful to slip a short piece of heat-shrink tubing onto the wire before crimping it. Then you just slide the tubing into place and heat it to shrink it.

The PWR Crimp makes a perfect, long-lasting wire connection. *—Bob Aberle*

West Mountain Radio (203) 853-8080; westmountainradio.com.

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FOR SALE: SUPER CYCLONE (PRE-WW II) & ROCKET MOTOR ignition engines, Arden 19 glow engine, excellent fins & compression; $275 (3). "Air News Yearbook" Vols. 1 & 2 (WW II); best reasonable offer. Bob Cowherd Sr. (315) 655-3864 'til 9 pm Eastern time. [2/05]

BACK ISSUES, MODEL MAGAZINES 61 Coach, Glastonbury, CT 06033-3237; davidbrown46@cox.net. [3/05]

R/C VIDEO: featuring aerial views from the pilot's seat; ⅓-scale J-3 Cub, ⅕ Beech Staggerwing and more! 90 minutes; VHS tape—$7.50; DVD-R—$10. Send check to Raymond Keel, 1200 E. Davis St., Ste. 115, Box 192, Mesquite, TX 75149. [4/05]

MAGAZINE BACK ISSUES: MAN, RCM, FM, model and full-scale titles, 1930-2003. Send SASE for list: Carolyn Gierke, 1276 Ransom, Lancaster, NY 14086. [11/04]

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WANTED: A COMPLETE SET OF PLANS (5 sheets) for Richard Barron's classic Boeing Stearman 96-in.-wingspan PT-13. I recently bought this model 80% completed and want to finish building it. Gerald L. Norway, 189 S. 2nd St., Fulton, NY 13069; (315) 593-8045. [2/05]

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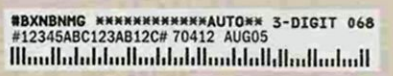

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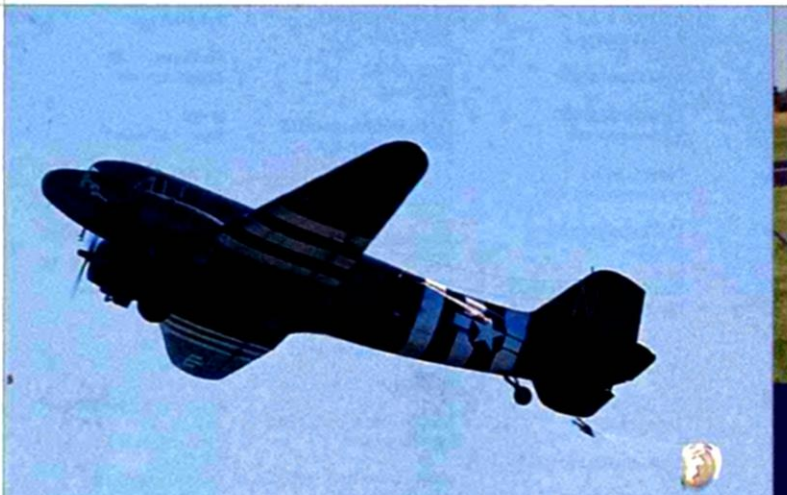


Above: the C-47 deploys the first of six paratroopers! Left: Greg Hahn and his caller fly the mighty C-47 at the 2004 U.S. Scale Masters Championships.

> "... Greg came up with a device that would eject each paratrooper sequentially ..."

Geronimo! RC Paratroopers

AT LAST—AN AUTHENTIC-LOOKING DEPLOYMENT METHOD

BY GERRY YARRISH

Each paratrooper is packed into its own compartment.

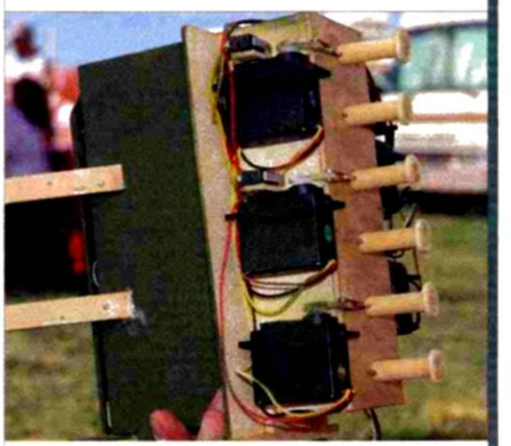
Greg points to the first microswitch that's activated by the servo that opens the ejector's door.

AMONG THE MORE FAMOUS SCENES of WW II was that of the Douglas C-47 Skytrain pouring Army paratroopers over battlefields on D-Day. Countless G.I.s arrived under those big, billowing silk chutes. It's little wonder, then, that dropping miniature-scale paratroopers out of RC airplanes has been tried innumerable times! But this function has never seemed to look quite right—that is, until the recent U.S. Scale Masters Championships in Gardner, KS.

Competing with a big, Ziroli-designed C-47A, Greg Hahn of New Castle, IN, figured out that for a scale paratrooper deployment to look right, the G.I.s had to "jump" out of the airplane with a slight delay between each one. So with some plywood, springs and dowels, Greg came up with a device that would eject each paratrooper sequentially with the flick of a single switch.

Using old, junk-drawer servos wired to some microswitches, the device is little more than a plywood box with six separate compartments that each contain a spring-loaded dowel plunger held in the firing position by a pull-pin. Each pin is attached to its own microswitch-driven servo. The servos are all powered by separate battery packs but are not controlled by the radio! A separate servo controlled by the radio opens the ejection box's door and then hits a microswitch to activate the first servo in the firing sequence. After it pulls the first pin, the servo then trips the microswitch for the next servo, and the operation is repeated in a cascading fashion until all six paratroopers have exited the aircraft.

As the airplane makes its pass at about ⅔ throttle, the delay between each servo produces a spacing of about 8 feet between each paratrooper. The result is a very scale, correct-looking deployment that flight judges always score well. I know it was only my imagination, but as the C-47 made its pass, I could have sworn I heard a faraway voice yell "Geronimo!" ✦



The first servo pulls the firing pin and then trips the next microswitch to activate the next servo, and the sequence is repeated until all six paratroopers have been ejected from the aircraft.